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DISEASES CAUSED BY BACTERIA AND FUNGI

WEHSER, E. (1938). Untersuchungen über das Blutbild des Rindes bei Eutererkrankungen. **[The Blood Picture of Cows with Mastitis].**—*Inaug. Diss., Leipzig.* pp. 47.

W. investigated the blood picture in 19 cases of chronic streptococcal mastitis, two cases of staphylococcal mastitis, one case of *Bacterium coli* mastitis, and one case of mixed *Bact. coli*-staphylococcal mastitis.

In the first group the predominating finding was an eosinophilia, neutropenia, an increase in monocytes, and a shift to the left (Schilling). In staphylococcal mastitis there was a neutrophilia, lymphocytopenia, and a shift to the left; there was no significant change in the other cases.

It is emphasized that changes in the blood picture are transient and vary at different stages of the disease: they are of no diagnostic value in themselves in mastitis, but are of some value in prognosis, as a reflection of the general health level.—J. E.

KLEIN, L. A., & KLECKNER, A. L. (1941). **Possibility of the Transmission of Mastitis Streptococci by Suckling Calves.**—*Vet. Ext. Quart. Univ. Pa.* No. 82. pp. 13–18.

Forty-one swabs were taken on different days from the mouths of four calves at intervals ranging from half-an-hour to 14 hours after they had sucked cows infected with *Streptococcus agalactiae*. Streptococci could be isolated up to four hours and frequently up to eight hours afterwards.

Calves were allowed to suck infected cows and then immediately afterwards, non-infected cows, twice daily, each calf first sucking a single infected cow and then a non-infected cow for a period of 5–36 days. Altogether 22 calves, five infected cows, and six healthy cows were included in this experiment. *Str. agalactiae* infection became established in two of the uninfected cows, in one after six days and in the other after 14 days. One of the cows had been exposed to infection previously in ten and the other in four suckling periods with negative results. The authors point out that these circumstances suggest that the operation of some factor in addition to mechanical transfer of the organism is required to establish infection. In this experiment it is significant that the quarters contracting infection were alone found to be harbouring *Staphylococcus aureus* prior to exposure.—S. J. EDWARDS.

PALMER, C. C., KAKAVAS, J. C., & HAY, J. R. (1941). **Studies on Bovine Mastitis. Mastitis in Heifers.**—*Amer. J. vet. Res.* **2.** 18–34.

The authors studied mastitis in heifers in three herds. In one of these herds the disease assumed epizootic proportions, but in the other two only sporadic cases occurred. In the first herd infection appeared in the milking herd and later spread to the bred and unbred heifers. The sporadic cases in the other two herds occurred in a few heifers. *Staphylococcus aureus* was the predominating causal organism in most of these cases. Streptococci, however, were isolated from ten heifers. In four animals the streptococci were in pure culture and were the only organisms obtained. In five heifers streptococci were found in certain quarters and *Staph. aureus* in the other quarters, and in one

heifer the staphylococci were mixed with streptococci. Of these ten strains of streptococci, only one was a typical group B mastitis strain, two belonged to group C, and seven strains were of types unusual in mastitis. These strains are described in some detail and bear some resemblance to a minute *Streptococcus* of human origin described by LONG & BLISS (1934). One of these strains caused mastitis in an experimental heifer. Abnormal swelling of the udder in heifers may be physiological or pathological. In the former state the exudate is viscid, may clot on standing and is bacteriologically sterile. Some infected heifers gave no sign of being infected until they calved, when they came into milk with one or more "blind" quarters. "Blind" quarters result from fibrosis involving the lactiferous sinus and teat duct. Natural recovery occurs in mature cows with staphylococcal mastitis. In such cows a specific bacteriophage could be demonstrated in the milk.

Bacteriophage therapy was satisfactory in infected dry heifers, but it was not as successful in lactating heifers.—D. L. HUGHES.

HADWEN, S. (1941). **Microscopic Detection of Mastitis.**—*Amer. J. vet. Res.* **2.** 11–17.

H. discusses the general application of the microscopic method in the diagnosis of mastitis. It is possible to study the progress of the disease microscopically. Signs of degeneration in the pathogenic cocci in milk may be a sign that the disease process is regressing. Common changes in phagocytosed cocci are a diminution in size with a surrounding area which is clear and unstained. This process of digestion may continue until the cocci are mere pin points. H. suggests that these degenerative changes should also be examined when therapeutic measures are tried in mastitis, as they may well be a useful indication of the success of the treatment. Frequent microscopic examination of milk, at six-hourly intervals, reveals surprising fluctuations in the number of visible organisms. Such fluctuations in the bacterial count may account for the variable results obtained with chemical tests in mastitis.

—D. L. HUGHES.

DAVIS, J. G. (1941). **A Simple, Differential Medium for Mastitis Testing—And General Purposes in Dairy Bacteriology.**—*Dairy Indust.* Feb. pp. 38–40.

A medium is described, the purpose of which is to detect the presence of streptococci, notably *Str. agalactiae*, in freshly taken milk samples. The principle involved is the power of streptococci to dissolve chalk by means of the acid formed from a fermentable sugar, *e.g.* lactose. Apparently, this reaction is most strongly produced by streptococci and enables a differentiation to be made from staphylococci and other organisms which also ferment lactose.

—S. J. EDWARDS.

RUSSELL, R. R., PALMER-JONES, T., & MOIR, G. M. (1939). **The Resazurin Test for Detecting Mastitis.**—*N.Z. J. Sci. Tech.* **21.** 161A–167A. [Extract from authors' conclusion copied *verbatim*].

The foregoing results demonstrate the value of the resazurin test as compared with other recognized methods. It may be regarded as a simple laboratory method for the reliable detection of mastitis. On account of the fact that the colour changes given by the test are due to the activity of both reductase and catalase enzymes, its results are considerably more accurate than those yielded by pH indicators, such as brom-thymol-blue, which are essentially for use in the field. Additional merits are the simplicity of the apparatus needed and the short time required to obtain the results. With sufficient test-tubes, dye solution, and a water-bath available, the tests are complete in little more than one hour. In fact, the worst cases of mastitis encountered during the testing may often be detected in a few minutes by drawing the samples into tubes already containing the required amount of dye solution and allowing to stand for a few minutes.

I. —. (1939). **Co-operative Plan for Controlling Mastitis.**—*Rep. Ont. vet. Coll. 1938.* pp. 14–15.

II. GLOVER, J. S. (1939). **Co-operative Work in an Attempt to Control the Spread of Mastitis in Dairy Herds.**—*Ibid.* pp. 15–16.

I & II. The college co-operates with the owner and the veterinarian in testing and supervising a herd for the control of mastitis. The veterinarian is subsidized by the college and there must be at least ten pure-bred cows in the herd if his services are to be available under the scheme; the college provides the apparatus and reagents for the brom-thymol-blue and chloride tests, analyses the test results, and makes the laboratory examinations.

Four field tests have been carried out :– (1) clinical examination of the udder; (2) the brom-thymol-blue test; (3) the strip cup test, and (4) the chloride test. Measures for the systematic control of the disease include :– separate milking of non-infected and infected cows, precautionary sanitation and hygienic measures, and elimination of infected animals to develop a mastitis-free herd from the offspring and the non-infected cows.

The scheme has been tested on 18 herds containing 298 cows; of these 116 were examined twice and 51 three times. Clinical interpretations were found to vary considerably in udder inspections by different examiners. In a few herds where the work was carefully controlled there was fairly close agreement between the physical and bacteriological examinations. The brom-thymol-blue tests and the bacteriological examinations agreed in 73% of cases. In the chloride test 51% of the quarters classified as suspicious were negative on bacteriological examination. The strip cup test was found to be of little value and was abandoned.—J. A. GRIFFITHS.

ALBORNOZ, J. E. (1940). Nuevo agente etiológico de las enfermedades de la primera edad de los terneros de la sabana de Bogotá. [**A Disease of Calves in the Bogota Plain**].—*Rev. Med. vet., Bogotá.* **10.** 490–494.

A. reports the isolation of an organism believed to be *Streptococcus pneumoniae* from the nasal discharge of calves with bronchopneumonia. The disease was artificially transmitted to other calves by intravenous injection or nasal instillation of culture, and increased in virulence during passage.—MILLER WATSON.

BLAKEMORE, F., ELLIOTT, S. D., & HART-MERCER, J. (1941). **Studies on Suppurative Polyarthritis (Joint-ill) in Lambs.**—*J. Path. Bact.* **52.** 57–83.

Detailed study of streptococci from affected lambs revealed the following common characteristics :– medium chains in broth, α haemolysis, improved growth from addition of serum to broth, final pH 4·4–4·9, and low pathogenicity for mice. They failed to grow on bile agar, did not hydrolyse sodium hippurate, and were killed by exposure to 60°C. for 30 min. All strains fermented trehalose, glucose, maltose, sucrose, dulcite, arabinose, and laevulose, but sorbitol, mannitol, inulin, and raffinose were unchanged, and the effect on lactose and salicin varied. Their common antigen showed marked cross-precipitation with typical group C strains, and a protein substance specific for joint-ill strains was precipitated from the crude extracts by means of ethyl alcohol.

In young lambs injected intravenously with α-haemolytic streptococci, a sustained bacteraemia occurred only in the case of the joint-ill type. The susceptibility of young lambs to these organisms, and the contrasting resistance of adult ewes and recovered lambs is clearly shown by the results of both animal inoculations and *in vitro* experiments.

Several cases of acute endocarditis accompanying natural cases of severe joint infection were studied at autopsy. Histological findings suggest that the valvular lesions may arise through bacterial embolism as well as from surface implantation.—J. KEPPIE.

SCHOFIELD, F. W., & JONES, T. (1939). **Investigation into Joint-Ill in Foals—a Summary of the Results in Fifty Cases.** —*Rep. Ont. vet. Coll. 1938.* pp. 29–33.

Joint-ill is still a serious menace in parts of Ontario province. This investigation was made to establish the aetiology of the disease. Bacteriological examinations constantly showed *Bacterium equirulis* in early acute cases. Haemolytic streptococci had been assumed locally to be the cause of all cases but this was found not to be the case. *Salmonella abortus equi*, so prevalent when the investigation of 1914 was carried out by SCHOFIELD, was not found once, a result to be expected as bacillary abortion is not now prevalent in mares in Canada. Sixty-three foals and other specimens were examined and three organisms were found to be responsible for almost all the infection. *B. equirulis* caused the highest percentage of infection in the newly born foals (60–70%), *B. coli* caused a large number of the infections in very young foals, while haemolytic streptococci were the cause of the less serious cases which occurred the second or third day after birth.—J. A. GRIFFITHS.

MINETT, F. C., & ELLIS, A. A. B. (1940). **Streptococcus Infections in Dogs.**—*Vet. J.* **96.** 438–449.

The object of this study was to test the effect of drugs of the sulphanilamide group on streptococcus infections in dogs. Sixty cases

of genital infections in bitches were treated. Most of the strains isolated from these cases belonged to group G of Lancefield's serological classification but group C strains were found in a few cases.

Sulphanilamide or M & B 693 used at the rate of 1 g. per 10 lb. body weight (divided into four equal doses) daily for ten days gave good levels of concentration in the blood. Neither produced a lasting effect although streptococci disappeared from the vagina for a few days after the treatment. A sodium salt of M & B 693 given intramuscularly to one infected bitch was also ineffective. The authors suggest that new compounds of these drugs may prove of service and that a combination of serum therapy and such drugs given during the period just before and after whelping (when the disease is in a more active stage than in the cases they treated) may give better results. As control measures they recommend that bitches should yield two negative swabs at a few weeks' interval before being mated and that puppies from infected bitches should be foster-mothered.

A few cases of chronic dermatitis (5 out of 6) and interdigital cysts (3 out of 3) were diagnosed as due to haemolytic streptococci. Drastic surgical treatment appeared to be more effective for these cases than medicinal treatment.

—C. V. WATKINS.

I. KODAMA, T., & NISIYAMA, S. (1938). **Studies on the Staphylococcal Toxin, Toxoid and Antitoxin. I.**—*Kitasato Arch. exp. Med.* **15.** 247–261. [In English].

II. KODAMA, T., & KOJIMA, T. (1939). **Studies of Staphylococcal Toxin, Toxoid and Antitoxin. II. Properties of α_2 and β Hemolysin. III. The Effect of Ascorbic Acid upon Staphylococcal Lysins and Organisms.**—*Ibid.* **16.** 36–55. [In English].

III. KOJIMA, T., & KODAMA, T. (1939). **Studies of Staphylococcal Toxin, Toxoid and Antitoxin. IV. Correlation of Sheep Cells Plate Hemolysis with Test Tube Hemolysis. V. Further Studies of Staphylococcal Exo-Toxins and Entero-Toxin. VI. Comparison of our α_2 Toxin and Morgan and Graydon's α_2 Toxin. VII. Correlation of Serological Classification with Pathogenicity of Staphylococci.**—*Ibid.* 197–217. [In English].

I. Using 12 staphylococcal strains, a study was made of the heat stability of the toxic and flocculating portions of the toxin and of the toxoid, of the effect of heating on the speed of flocculation, of the toxigenic and antigenic potency of fractions of toxin, of the antitoxin-binding power, the flocculating value, and the immunizing effect of toxoids precipitated by various methods, and of the dissociation between the antitoxic and flocculating properties of the antibodies.

II. Variations in the toxic and haemolytic properties of nine staphylococcal strains were produced by the presence of CO_2, alteration in the culture medium, and differences in the incubation period. Changes in toxic and haemolytic activity were caused by heat denaturation but not by chemical precipitation. Ascorbic acid was found to have a growth-inhibiting and bactericidal effect upon staphylococci but to cause no apparent inactivation of the toxins.

III. A total of 198 human and 111 animal strains of staphylococci were classified according to the type of haemolysis produced on sheep blood agar plates. Pyogenic strains of human origin produced usually α-haemolysis while those of animal origin produced usually the $\alpha\beta$ type, both types being defined. In general, test-tube haemolytic tests confirmed the results obtained on blood agar plates. Certain animal strains produced pure β- or $\alpha\beta$-toxin while pure α-toxin was obtained from many human strains. The enterotoxin produced by all of 6 β- or $\alpha\beta$-strains but not by pure α-strains, was shown to be definitely antigenic and to be differentiated with difficulty from β-toxin. Their α_2-toxin was found by the authors to correspond with Morgan and Graydon's α_1-toxin. Four serological types of staphylococci were differentiated by slide agglutination. Types I and II strains were nearly always pathogenic for rabbits and type III mostly non-pathogenic. The serological type of a strain could not be correlated with its origin.—R. O. MUIR.

FISK, A. (1940). **The Technique of the Coagulase Test for Staphylococci.**—*Brit. J. exp. Path.* **21.** 311–314. [Author's summary copied *verbatim*].

1. Within wide limits the amount of sodium citrate does not materially affect the coagulase

test. 2. Citrated plasma diluted 10 or 20 times gives satisfactory results. 3. Human plasma from different individuals does not show wide variations in clotting time. 4. The citrated plasma remains suitable for the test for several weeks if kept undiluted under sterile conditions. 5. Staphylococci growing in a variety of media produce coagulase. Of a number of liquid media, broth gave a culture which produced coagulation most quickly. Agar cultures may also be employed, in which case it is best to emulsify the organism in broth to form an even suspension of an opacity approximately equal to that of a 24-hour broth culture. 6. There is an optimum ratio between amount of organism and amount of plasma. 7. The reaction occurs most quickly at 37°C.

KRANEVELD, F. C., & DJAENOEDIN, R. (1940). Proeven over de overbrenging van miltvuur door den Tabanus rubidus Wied. op paard en buffel. [**The Transmission of Anthrax to Horses and Buffaloes by** *Tabanus rubidus*].—*Veearts. Meded. Dep. econ. Zaken Ned.-Ind.* No. 83. pp. 42. [English summary].

Apart from MITZMAIN (1914), the authors believe themselves to be the first workers to carry out research on anthrax transmission in horses and cattle by fly vectors. Using *T. rubidus* which is common in Java they fed these flies singly or in batches on horses, buffaloes, or g. pigs in the septicaemic stage of anthrax, removed them before they had become fully fed and transferred them at an interval of 3–9 sec. to uninfected horses and buffaloes. Of fourteen horses twelve were successfully infected and eleven of these died of anthrax. Two of them had been infected by a single fly each and the rest by a larger number. Six buffaloes were used in tests in which 50–75 infected flies were fed on each animal. Anthrax could be transmitted only by feeding 75 flies on each buffalo.

In further tests the flies were fully fed on the infected host, kept for 48 hours (the natural interval between feeds), and then placed on susceptible horses. Under these conditions anthrax was less readily transmitted, as only two out of six horses sickened, and only one of these died of anthrax: the latter had been infected by 40 flies (the maximum number used in this series).

Observations on infected horses showed that septicaemia could occur up to eight hours before death, though the first few bacilli in the blood were observed in one case 16 hours before death. Septicaemia was detected in only one of three infected buffaloes 10 hours before death.

In discussing the work it was concluded that tabanids may play a part in spreading anthrax in Java. The risk is increased by the animals' attempts to rid themselves of flies, as flies incompletely fed on an anthrax-infected animal would be likely to attack others while they are carrying the fresh infection.—J. E.

PETER, H. (1939): Untersuchungen über das Wesen der pathogenen Wirkung des Milzbranderregers. [**The Pathogenic Effect of** *Bacillus anthracis*].—*Zbl. Bakt. I.* (*Orig.*). **144.** 463–471.

WOHLFEIL & WOLLENBERG [*V. B.* 9. 219.] found that the life of anthrax-infected g. pigs could be prolonged by the injection of iodoacetic acid, which inhibits the formation of proteolytic enzymes. P. investigated the effects of this and other related acids, using white mice and the strain of *B. anthracis* used by W. & W.

It was found that the toxic dose of chloracetic or cyanacetic acid was ten times that of iodoacetic or bromacetic acid. The average life of white mice after injection with 1/10th loopful of anthrax culture was 38 hours. Injection of 0·3 c.c. N/10 chloracetic acid increased this time to 83 hours, and of the same quantity of cyanacetic acid to 53 hours. Another group received small repeated doses of the acids. Again chloracetic acid had the most marked effect. Intraperitoneal injections of acid were most effective, then subcutaneous, and intravenous least effective. Intravenous injection appeared to damage the endothelial lining of the blood vessels. The absorption of a subcutaneous injection might be hindered by the oedema that develops at the local lesion. Results of small infecting doses were variable, the disease appeared in a chronic form and consequent protracted treatment with acids caused poisoning; here chloracetic acid was not as toxic as the other acids. After bacilli were demonstrable in the blood, the life of mice could not be prolonged by the injection of acids.

P. concludes that the injection of acid delays the formation of proteolytic enzymes by the action of which the bacilli are able to damage the vessel walls and thereby permeate the tissues.

The histopathology of the infected mice was

studied; thrombi containing bacilli were especially frequent in the lung capillaries. P. suggests that damage to the endothelium by proteolytic enzymes leads to thrombus formation. Embolism may result from disintegration of these thrombi and death result from failure of the right heart.—D. L. ROBARTS.

BEKKER, J. H. (1938). Asporogene klonen van Bacillus anthracis. [**Asporogenic strains of *B. anthracis***].—*Inaug. Diss., Amsterdam.* pp. 50.

B. obtained asporogenic strains of *B. anthracis* by incubation for:– (1) 24 hours on ordinary broth agar at 42°C., (2) 24 hours on 5% glycerin agar at 37°C., and (3) 48 hours on 5% glycerin agar at 37°C. The best results were obtained by the first method. He compared the characteristics of the new strains with the initial strain according to the biochemical reactions, germinative power, pathological effects, culture on synthetic media, reaction to bacteriophage, and the duration of the asporogenic state. He concluded that it is possible, although difficult, to obtain asporogenic daughter strains from sporogenic strains, that obvious differences exist between sporogenic and asporogenic strains, and that asporogenic strains must not be considered as new species, but as " mutilated or adapted " cells showing a fixed genotypical constitution. Some of the asporogenic strains observed by B. regained their sporulating power after a long period (2½ years). In some cases, however, the degeneration of the strain was so complete that, even under the most favourable conditions, it did not regain its initial state. Some strains were observed to be asporogenic for four years. —L. TOBBACK.

ZWICKY, H. (1940). Die Bekämpfung der Rindertuberkulose im Zusammenhang mit der Haltungs- und Milchhygiene in Dänemark, Schweden und Finnland. [**Control of Bovine Tuberculosis in Relation to Livestock and Milk Hygiene in Denmark, Sweden and Finland**]. pp. 80. Frauenfeld & Leipzig: von Huber & Co. [8vo].

Z. gives an interesting and informative description of a study tour through Denmark, Sweden, and Finland, with particular reference to TB. and its control and to cattle husbandry in general. The contents of the book can be outlined only here. The first 20 pages deal with Denmark, emphasis being laid on the impetus given to tuberculosis eradication by the higher price obtainable for milk from free herds. Apparently a general levy is made and a bonus paid according to the TB. status of the herd. Fifteen large creameries will only accept milk from TB.-free herds. In addition, compensation is paid for tuberculous animals slaughtered as well as a premium towards the cost of clean replacements. Whilst the plan originated by BANG had not resulted in any great diminution of the incidence of the disease over some thirty years, the above incentives are said to have resulted within five years in the eradication of the disease from two of the southern islands and from a large part of Zealand, and in a reduction of the incidence in Jutland from 75% in 1930 to 46% in 1937, with an additional 5–6% each year. The single intracutaneous test is used, and up to July 1938, 74,244 herds had been tested at least once. Whilst TB. eradication is voluntary, compulsion can be used if 90% of the farms in an area are controlling the disease.

Pages 22–34 deal with Sweden. In general here milk is priced on a quality basis with particular reference to its fat content. Power exists for making pasteurization compulsory in towns. Control schemes for TB. include Bang's method (about 400,000 animals) and clinical examination (about 260,000 animals over two years) out of a total stock of about three million, free tests and advice (the owner paying mileage for visits) a guaranteed price for slaughtered reactors, and bonuses for milk from tuberculin tested or clinically examined herds. The single intradermal test is used with tuberculin prepared in Dorset's synthetic medium.

Pages 34–80 deal with Finland. Bovine TB. is practically non-existent, the figure for Helsinki abattoir being given as 0·05%, based on careful examination. In 5,000 controlled herds (about 50,000 cows), no single case of open TB. was found in 1938, *i.e.* the year prior to this report. Tuberculin tests are carried out in these herds at least once in five years, and in the year 1935 positive reactors totalled 0·81% and doubtful reactors 5·93%.

Emphasis is laid by Z. on the very sensitive nature of the test used and the fact that the figures are much higher than the abattoir figure already given. Reactors were found in only 60 herds in Finland in 1939. Abortion, on the other hand, is common, 11·6% of herds supplying Helsinki being affected. Milk from

such herds cannot be sold for drinking in the raw state. Z. comments on the cleanliness and efficiency of milk production in Finland. Milk is usually drunk raw and is sold on a quality basis, attention being paid to fat content, " purity ", reductase time, and bacterial content. Class Ia must have 3·8% fat, a reductase time of more than 5½ hours, and less than one million bacteria per c.c. The consumption of milk has risen from 335 litres per head per year in 1924 to 424 litres in 1935, and, whilst only 33% was class I in 1924 and the average fat content was 3·2%, in 1935 80% fell into class I and the average fat content was 3·8%. Over and above these classes of market milk comes " certified " milk for which regulations are more stringent, particularly as regards production. Only 5·5% of cows are said to harbour *Streptococcus agalactiae*.

Much detail is also given regarding individual herds, breeds, feeding, veterinary colleges, state institutions and personalities in the three countries.—A. W. STABLEFORTH.

KARMANN, P. (1941). Die Bekämpfung der Tuberkulose des Rindes im Rahmen des Rindergesundheitsdienstes. **[Control of Bovine TB. by the Cattle Health Service].** —*Berl. Münch. tierärztl. Wschr.* March 14th. 127–128.

K. describes a scheme for the eradication of TB. in dairy cattle in three dairy farming districts of the Rhineland; this was begun in 1939. All cattle, including calves, are tested by the intradermal test. A second test is applied after eight weeks on all farms where no reactors are detected by the first test; these farms are then known as TB.-free or "A" farms. A bonus on the milk sales is granted by the authorities to each of these herds. " B " and " C " class farms are classified according to the degree of infection found on them. To hasten the eradication of TB. on " C " farms, a reduction in the price of the milk sold is enforced. Reactors are isolated from non-reactors in separate premises, if possible, and calves are reared on milk from non-reacting cows. During the 18 months that the scheme has been in operation, the number of "A" herds has increased from 546 to 673 and the " B " and " C " farms have decreased by nearly 100 each.—E. C. HULSE.

—. (1939). **[Report of Committee on] Tuberculosis [American Veterinary Medical Association].**—*J. Amer. vet. med. Ass.* **95.** 611–613.

The progress of the national bovine TB. eradication campaign is reviewed. At the end of 1939 the whole of the U.S.A. except eight counties in California was classified in the modified accredited area (incidence less than 0·5%). Various aspects of the control work are referred to, *e.g.* the role of meat-inspection records in tracing infected localities, the continued occurrence of " no visible lesion reactors ", and the problem of TB. in poultry, which is very difficult to control.—J. E.

RITTER, H. (1940). Bakteriologische und serologische Studien über die offene Tuberkulose des Rindes. **[Bacteriological and Serological Studies on Open TB. in Cattle].**—*Zbl. Bakt. I.* (*Orig.*). **145.** 157–163.

In the course of the TB. control scheme, R. examined samples of bronchial secretion, serum, and milk from 508 cows which were suspected on clinical grounds of having " open " TB. Examination of bronchial secretion revealed 219 cases of pulmonary TB. and, in 20 of these animals, there were tubercle bacilli in the milk, *i.e.* 10% of animals with " open " lung TB. showed a coexistent tuberculous mastitis. As only a single group of quarter samples was examined from each animal, it is probable that the incidence of udder TB. among the 508 cows was in fact higher than these figures indicate.

Complement-fixation tests made with the serum and milk from the 20 cows with udder TB. gave positive results in every animal; in 19 cows the titre was as high with serum as with milk or higher, but in one animal the milk gave a considerably higher titre than the serum. The yielding of positive c.-f. tests in cases of " open " lung and udder TB. is probably due to the slowly progressive lesions from which haematogenous spread to the udder takes place and, in the milk, to the infiltrative character of the common form of tuberculous mastitis.

The 199 cattle with " open " lung TB. gave a varied response to serological tests, 121 giving a negative reaction with both serum and milk. The test appears unsuitable as a confirmatory method for diagnosis of pulmonary TB.

—E. G. WHITE.

SCHUTZLER, W. (1938). Lässt sich die Probe nach Triboulet zur Diagnose der Rinder-

tuberkulose verwenden? **[Value of Triboulet's Test for Bovine TB.].**—*Inaug. Diss., Leipzig.* pp. 36.

TRIBOULET's test for albumin in faeces, which consists of precipitation of the albumin from a water extract with a mixture of mercuric chloride and acetic acid, was carried out on 100 tuberculous cattle and found to be valueless.

By this test TRIBOULET claimed that intestinal TB. could be diagnosed in cases already known to be tuberculous; his theory was that the tuberculous lesions in the intestinal wall result in the escape of albumin into the lumen of the bowel.—J. E.

*GERBERT, H. (1939). Untersuchungen zur Typenbestimmung der bei Schweinen vorkommenden Tuberkelbakterien. **[Type Determination of TB. in Swine].**—*Inaug. Diss., Leipzig.* [Translation of abst. in *Dtsch. tierärztl. Wschr.* **48.** 286].

Of 50 tuberculous pigs 33 were infected by the bovine type bacillus, 5 by the avian type, 3 by the bovine and human types together, and 5 by the bovine and avian types together. Type determination failed in 4 cases. The cultural method was superior to the animal inoculation method in this work and both HCl and NaOH were valuable in the preliminary treatment of samples of material, though the latter was slightly more reliable. The media of Petragnani and of Witte were preferred.

PRÖSCH, E. (1938). Bestehen Zusammenhänge zwischen der tuberkulösen Erkrankung der Buglymphknoten und der Tuberkulose der Lymphknoten des Kopfes beim Schwein? **[Connexion between TB. of the Shoulder Lymph Nodes and of the Lymph Nodes of the Head of Swine].**—*Inaug. Diss., Leipzig.* pp. 25.

P. examined the lymph nodes of 500 pigs found to be tuberculous at meat inspection. The lymph nodes of the shoulder (superficial cervical) were tuberculous in 52 cases. In six of these the pharyngeal l.nn. were not tuberculous, but other regional l.nn. were affected in such a way as to indicate lymphogenous generalization. In the other 46 cases the pharyngeal l.nn. were also tuberculous and it was believed that the shoulder l.nn. were infected from the latter. If this is agreed, the forelimb of normal appearance, on the side on which the shoulder l.nn. are tuberculous, need not be considered as infected, as it is according to present German meat inspection laws, but may be passed for food after removal of the lymph nodes.—J. E.

FELDMAN, W. H., & KARLSON, A. G. (1940). **Avian Tubercle Bacilli in Tonsils of Swine.**—*J. Amer. vet. med. Ass.* **96.** 146–148.

From 94 swine carcasses, in 54 of which no lesions of TB. were found, one tonsil was removed and examined by cultural means for tubercle bacilli. Positive results were obtained in 27 cases and 22 strains of the organism were isolated, 14 of these being recovered from carcasses which had been without gross lesions of TB. All the strains were proved, by biological tests, to be of the avian type.

—J. R. LAWSON.

BELLER, K. (1941). Die Ziegentuberkulose, ihre Entstehung, Verbreitung, Feststellung und Bekämpfung. **[TB. in Goats].**—*Dtsch. tierärztl. Wschr.* **49.** 131–132.

B. gives a brief resumé of the literature on this subject. Infection with the bovine type of bacillus was found to be present in all cases examined. In the majority of cases, the infected goats had been housed in contact with cattle. Infection generally occurred by the respiratory tract rather than by ingestion, and lesions of an exudative character were found in the lungs. The intensity of reaction to the intradermal tuberculin test was greater in proportion than that of cattle.

The complement-fixation test was of use only when the infection had generalized into the blood and lymph stream. Infection of the mammary gland was rare and complement-fixing antibodies were not found in the milk.

—E. C. HULSE.

MUSHATT, C. (1940). **Non-Pulmonary Tuberculosis Caused by the Bovine Type of Tubercle Bacillus in Children in Eire.**—*J. Hyg., Camb.* **40.** 396–405. [Author's summary copied *verbatim*].

1. The types of strains of tubercle bacilli isolated from fifty cases of non-pulmonary tuberculosis in children, 0–14 years of age, in Eire have been determined. In cervical gland disease ten (71·4%) out of fourteen strains were bovine, in bone and joint disease four (18·2%) out of twenty-two were bovine and in meningitis three (25%) out of twelve were bovine. Only two cases of primary abdominal tubercu-

losis were examined. Both yielded human strains.

2. The difficulties in assessing the true significance of the results recorded are briefly discussed.

3. The technique used and some bacteriological observations made are described.

HÜLPHERS, G. (1941). Undersökningar på i hönsägg förekommande tuberkelbacillers resistens vid kokning. [**Tests on the Resistance to Boiling of Tubercle Bacilli in Hens' Eggs**].—*Svensk VetTidskr.* **46.** 135–139. [Abst. from English summary].

Suspensions were made in normal saline of the livers of ten tuberculous hens, and coloured with Indian ink. Each suspension was inoculated into 12 eggs. The eggs were boiled, two at a time, for 3, 4, 5, 6, 7, or 8 min. respectively. The breast musculature of hens was then inoculated with the white or yolk of the eggs.

In one case the bacilli were killed after the boiling of the eggs for 8 min., in two after 4 min., in three after 5 min., in two after 7 min., and in one after 8 min. In one case they were not killed after boiling for 8 min. The danger to man of tubercle bacilli in hen's eggs, should not, therefore, be underestimated.

DAVIES, R. (1940). **The Effect of Carbon Dioxide on the Growth of the Tubercle Bacillus.**—*Brit. J. exp. Path.* **21.** 243–253. [Author's summary copied *verbatim*].

(1) The effect of carbon dioxide on the growth of the human-type tubercle bacillus strain H.37 has been investigated under strictly defined conditions. (2) Optimum growth of this organism under the conditions used was obtained in the presence of 2·5 per cent. of carbon dioxide in equilibrium with 0·0125 *M* sodium bicarbonate at pH 7·4. (3) The effect on growth is due to a specific action of carbon dioxide and not to the presence of a particular concentration of ions in the medium. (4) A possible relationship between the concentration of carbon dioxide in the lungs, and the effectiveness of certain methods of treating pulmonary tuberculosis is discussed.

PAILLI, F. (1938). Sulla cultura dei ceppi bovini di B. di Koch nei substrati liquidi. [**Culture of Bovine Type Tubercle Bacilli in Liquid Media**].—*Diagn. Tec. Lab., Napoli.* **9.** 331–336. [Abst. from abst. in *Bull. Inst. Pasteur.* **37.** 133].

In view of the difficulty of transplanting a strain of bovine type bacilli from a solid into a liquid medium, particularly one grown on Petragnani's medium containing beeswax, P. passed the cultures first on to potato prior to transference to a liquid medium. The potato medium was treated with Sauton's medium and a chloroform solution of wax.

By this method P. regularly succeeded in transferring the cultures.

PAWLOFF, P. (1939). Das Verhältnis zwischen der pH-Zahl des synthetischen Nährbodens von Henley und dem Wachstum einiger Tuberkulosenstämme. [**Relation Between the pH of Henley's Synthetic Medium and the Growth of Various Strains of Tubercle Bacilli**].—*Z. Infekt-Kr. Haustiere.* **55.** 300–301.

One bovine type, one human type, and four avian type strains of *Mycobacterium tuberculosis* grew on Henley's medium at pH 7·2, but not at pH 6·4–6·6. After five passages at 7·2 growth occurred on the acid media.—D. L. ROBARTS.

HANKS, J. H., & EVANS, B. (1940). **The Action of Serum, Cells and Blood on Acid-Fast Bacteria in vitro. III. Evidence of the Nutritional Basis of the So-called Bactericidal Action of Rabbit Serum on *Mycobacterium phlei*.**—*Amer. Rev. Tuberc.* **41.** 637–644. [For previous parts, see *V. B.* **10.** 771].

Investigations were made into the viability of saprophytic acid-fast Timothy grass bacilli in rabbit blood, serum, serum heated to 55°C., red blood cells made up to original volume in saline, and in these blood fractions with the addition of 10% of Long's medium. There was no evidence of any viability decline in fresh blood, serum, and heated serum with added Long's medium although without this addition there was a rapid decrease in viability after 48 hours. Inquiry was made to test whether the inhibiting action of the serum was due to (a) the freshness of bactericidal or bacteriostatic substances, (b) physical or chemical properties of the serum, or (c) the nutritional adaptability of *Mycobact. phlei* to the substrate afforded by the serum. It was found that the viability decline of the organisms in rabbit serum could not be due to bactericidal substances in the serum, and the authors conclude that the fate

of *Mycobact. phlei* organisms is controlled by nutritional factors.—ALFRED EDEN.

EMMART, E. W., & SMITH, M. I. (1941). **The Growth and Effects of the Tubercle Bacillus on the Chorio-allantoic Membrane of the Chick Embryo : a Method for Studies in Chemotherapy.**—*Publ. Hlth Rep., Wash.* **56.** 1277–1286. [Authors' summary copied *verbatim*].

1. The growth of three human strains and one bovine strain of tubercle bacilli on the chorio-allantoic membrane of the chick embryo has been studied, and the cytological effects thereof described.

2. The incidence of membranes with tubercles and the extent of tubercle development on the membranes following implantation of tubercle bacilli of strains of different degrees of virulence indicate that the method may be employed in evaluating their pathogenicity.

3. No tubercles were produced on the chorio-allantoic membrane by inoculations either with tuberculin or heat-killed tubercle bacilli.

4. It is suggested that the method of implantation on the chorio-allantoic membrane is applicable to the determination, within the short space of 6 days, of the tuberculocidal action of a drug or of its ability to attenuate the virulence of a given strain of tubercle bacilli. Further work along these lines is in progress.

I. LESUK, A., & ANDERSON, R. J. (1940). **The Chemistry of the Lipids of Tubercle Bacilli. LXII. Studies on Mycolic Acid.**—*J. biol. Chem.* **136.** 603–613.

II. PECK, R. L., & ANDERSON, R. J. (1941). **The Chemistry of the Lipids of Tubercle Bacilli. LXIII. The Fatty Acids in the Phosphatide Prepared from Cell Residues from Tuberculin.**—*Ibid.* **138.** 135–140. [For part LXI, see *V. B.* **11.** 211].

I. Mycolic acid, the principal ether-soluble constituent obtained on saponification of the purified wax of human type tubercle bacilli, yields on demethylation with HI a monoiodo compound, which on reduction gives hydroxynormycolic acid ; this in turn is split by hydrolysis into *n*-hexacosanoic acid and a non-volatile residue. A diiodonormycolic acid, produced by refluxing mycolic acid with concentrated HI, yields on reduction normycolic acid which is decarboxylated on pyrolysis with no production of volatile acid. There is evidence that mycolic acid is a mixture of two acids as a small amount of hydroxyacid can be separated from both hydroxynormycolic acid and normycolic acid.

On oxidation with chromic acid a complex mixture of mono- and dicarboxylic acids is produced, amongst which the only acids so far identified are stearic, *n*-hexadecane-1,16 dicarboxylic, and *n*-hexacosanoic acids.

II. Fatty acids were obtained from the phosphatide prepared from the bacterial residues of the human tubercle bacillus, strain H-37. The solid saturated acids consisted principally of palmitic acid, but traces of stearic and mycolic acids were also present. The liquid unsaturated acid after catalytic reduction was mainly stearic acid, showing that the principal acid of the unsaturated class was oleic acid ; tuberculostearic acid, $C_{19}H_{38}O_2$, was the chief of the liquid saturated acids. A small amount of higher branched-chain dextrorotatory acids, not definitely identified, was also present, but no trace of pure phthioic acid was found.—ALFRED EDEN.

ANDERSON, R. J. (1939). **The Chemistry of the Lipoids of the Tubercle Bacillus and certain other Microorganisms.**—*Fortschr. Chem. organ. Naturstoffe.* **3.** 145–202. [In English].

Acid-fast bacteria elaborate their lipoids on an entirely different pattern from analogous compounds of plant or animal origin. The neutral fats are esters of fatty acids and the disaccharide trehalose. The phosphatides are characterized by the absence of the nitrogen bases, choline and aminoethyl alcohol, which are found in ordinary cephalin and lecithin. The waxes are complex compounds, each type of acid-fast bacillus producing a wax peculiar to itself.

Outlines of the methods for the extraction of the lipoids are given, depending mainly on the use of neutral solvents. The bacteria were grown on media of the Long or Sauton type. Details are given of the separation of the alcohol-ether soluble lipoids which consist mainly of three types of compounds, namely phosphatides, acetone-soluble fats, and a low melting wax, together with traces of polysaccharides and certain other water-soluble compounds. The relative amounts of these obtained from human, avian, and bovine types of tubercle bacilli, and the Timothy grass and leprosy bacilli are given in tabular form.

Details are given of the physical and chemical

properties of the phosphatides and of the cleavage products of these phosphatides on acid hydrolysis. The acetone-soluble fats are discussed with details of their saponification and the separation of the cleavage products. The fatty acids are of three types (a) solid saturated acids, (b) liquid fatty acids and (c) liquid saturated fatty acids. In the course of this work many previously undescribed compounds were isolated and their chemical and physical properties examined. The waxes are also fully discussed and analyses are given of the waxes and of the unsaponifiable fractions of human, avian, and bovine types of tubercle bacilli and of the Timothy grass bacillus.

Attention is also drawn to the higher alcohols and the pigments including phthiocol, riboflavin, and various carotenoid pigments. Consideration is given to the present state of knowledge on the firmly bound lipoids of tubercle bacilli, especially of the avian type, and also of leprosy bacilli. The available evidence seems to indicate that sterols are not metabolic products of tubercle bacilli. Lipoids of certain other micro-organisms are discussed, including those of *Phytomonas tumefaciens*, *Lactobacillus acidophilus*, and yeast.

Much of the evidence and data presented in this review is a result of the work of A. and his collaborators, who have worked very extensively in this field. Readers interested in the lipoid constituents of the acid-fast bacteria should consult the original for fuller details and for the extensive bibliography.—ALFRED EDEN.

KARJALA, S. A., & HEIDELBERGER, M. (1941). **Specific and Non-Specific Cell Polysaccharides of an Avian Strain of Tubercle Bacillus.**—*J. biol. Chem.* **137.** 189–203.

Details are given of experimental methods for extracting the polysaccharides from the cells of an avian strain of tubercle bacilli, no. 531. The yield was lower than with human and bovine types, but the polysaccharides from the avian strain were intermediate in respect of the proportion of serologically active material. These specific polysaccharides showed the same immunological specificities as those of the human and bovine types, but the portion corresponding to the C fraction [see protocols in the original for details] in these types was weaker in serological activity. The soluble serologically inactive phosphorylated carbohydrate previously reported in the bovine types had no counterpart in the avian type. As with the mammalian types the pentose-containing fractions of the avian polysaccharides show the highest serological activity.—A. E.

GRIFFITH, A. S. (1941). **The Problem of the Virulence of the Tubercle Bacillus.**—*Tubercle, Lond.* **22.** 33–39.

In this article G. gives a general review of his investigations on the comparative susceptibility of man to human and bovine TB., with special reference to the types of TB. in phthisis and in human cutaneous lesions. Details have been given in previous publications. The only new observation concerns the attempted attenuation of several strains of *Mycobacterium tuberculosis* on bile-egg medium. The strains were sub-cultured every 2–4 weeks for about eight years, and were discontinued after they had been subjected to the action of bile for 3,990, 3,368, 3,159, 2,253, and 1,925 days respectively (bovine strains), 3,215 days (human strain), and " ten years or more " (avian strain). All were pathogenic to some extent at the end of these periods.—R. E. GLOVER.

ZORZOLI, G. (1940). Influenza dei filtrati di alcuni miceti sul bacillo tubercolare umano e bovino. Nota prima. Nota seconda. **[Influence of the Filtrates of Some Fungi on Human and Bovine Type Tubercle Bacilli. I & II].**—*Ann. Ist. Carlo Forlanini.* **4.** 208–220 and 221–237. [English, French, German and Spanish summaries]. [Abst. from author's conclusions].

I. Z. studied the influence on human and bovine type tubercle bacilli (strains H522 and B12 respectively) of filtrates of *Monilia albicans* (R1), *Endomyces albicans* (R2, R5), *Mycotorula albicans* (R4), *Aspergillus albus* (P229), *A. fumigatus* (P230), and *A. niger* (P237). Some of the filtrates were without effect, or only slightly retarded the growth of the bacilli. Filtrates of R1 and the three aspergilli had a noticeable bacteriostatic effect on both types of bacilli; this was, however, more marked on the human type. The effect was produced both when the bacilli were cultured in Sauton's medium containing filtrate and when bacilli treated with filtrate were sown on Petragnani's solid medium, but was more clearly shown on the solid medium. Exposure for 24 hours to filtrates of *M. albicans* (R1) or *A. niger* (P237) diluted to 25% with physiological saline com-

pletely inhibited the growth of human type bacilli on the solid medium. *A. niger* (P237) filtrate was the most active one tested, inhibiting the growth of human type bacilli after 72 hours' exposure at 5%, and of bovine type bacilli after the same exposure at 25% dilution.

II. Z. conducted a further series of *in vitro* tests on the same fungus filtrates, using different media etc., and obtained confirmation of the results given in I.

He also carried out *in vivo* tests by inoculating g. pigs with tubercle bacilli treated for varying times with filtrates of varying strength. G. pigs inoculated with bacilli subjected for a short time to a highly diluted filtrate, rarely showed lesions as extensive and severe as those of the control animals, but merely fibrous or fibro-caseous alterations in the lymph nodes without localizations in other organs. In g. pigs in which P.M. examination and spleen culture were negative, histological examination of the spleen revealed hyperplastic changes which may have been due to the toxins of the inoculated bacilli.

Subjection of the filtrates of *M. albicans* (R1), *A. albus* (P229), and *A. niger* (P237) for one hour to a temperature of 100°C. did not destroy their bacteriostatic power. Tubercle bacilli treated for as long as 96 hours with various filtrates retained their characteristic alcohol and acid resistance.

HAILER, E. (1938–39). Die Einwirkung keimtötender Stoffe auf Tuberkelbacillen des Typus humanus und bovinus. II. Mitteilung. Die Wirkung von anorganischen Säuren und Säuren der aliphatischen Reihe. III. Mitteilung. Versuche mit einigen rasch wirkenden Mitteln, namentlich aus der Gruppe der Alkohole und Phenole. IV. Mitteilung. Versuche mit Säuren der aromatischen Reihe. V. Mitteilung. Versuche mit Basen, Salzen, Estern, und einigen indifferenten Verbindungen. **[The Influence of Bactericidal Agents on Human and Bovine Type Tubercle Bacilli. II. The Action of Inorganic Acids and Acids of the Aliphatic Series. III. Tests with Alcohols and Phenols. IV. Aromatic Acids. V. Experiments with Bases, Salts, Esters and Some Indifferent Combinations].**—*Z. Hyg. InfektKr.* **120.** 663–677, and **121.** 67–74, 405–431 and 633-648. [Part I appeared in *Z. Hyg. InfektKr.* **110.** 22–36. (1929)].

II. Several strains of human and bovine tubercle bacilli were subjected to the action of numerous mineral and aliphatic acids in various concentrations. Human and bovine type strains behaved similarly. [It is difficult to draw practical conclusions from the complicated results, for which the original should be studied.]

III. Pure cultures of tubercle bacilli on batiste fabric were killed in 3 min. by 50–80% ethyl alcohol, 60% normal propyl alcohol, 5% cresol soap, 5% "baktol", and tincture of iodine. 5% "sagrotan" was somewhat less effective. The addition of thiocyanic acid to the above alcohols markedly increased their bactericidal action. Corrosive sublimate and "weidnerit-gel" gave irregular and uncertain results, whilst 0·1–10% "zephirol" (a quarternary ammonium compound) and 5% chinosol were of no great value.

IV. About 50 aromatic acids were tested on pure cultures of human and bovine tubercle bacilli and many of them proved to have a good bactericidal action; the results are summarized in a table which should be studied, showing the killing times in hours for the various acids in eight concentrations.

V. This work was concluded with substances named in the title. Saturated NaCl solution was not regularly lethal even after 72 hours, although LiCl and $CaCl_2$ were lethal in 24 hours. Zephirol was ineffective. 0·1% $HgCl_2$ was not regularly lethal after 10 min. Alkalis and alkaline earths were inactive, whilst NH_3 and tertiary amines had a good lethal action. Of the esters of organic acids, ethyl formate was the most bactericidal, ethyl acetate and ethyl propionate were relatively inactive, and ethyl carbonate (urethane) was quite inactive.

Part V is followed by a general summary of the whole work. As pure cultures were used, the results are not applicable to practical disinfection purposes without appropriate supplementary trials on contaminated material such as sputum.—J. E.

HAUDUROY, P. (1939). Contribution au problème des formes non acido-résistantes des bactéries acido-alcoolo-résistantes. **[Non-Acid-Fast Forms of Acid-Fast Bacilli].**—*Rev. Tuberc., Paris.* **5.** 146–169.

H. reviews his own enquiries and those of

other workers into the significance of elements in acid-fast bacilli which do not stain by the Ziehl-Neelsen method. In his investigation, *Mycobacterium phlei* was selected as a representative organism and smears from liquid cultures were prepared on coverslips by a special technique which permitted an examination of the cultures in all stages without unduly disturbing the elements.

H. considers that acid-fast and non-acid-fast forms are two phases of a single organism and not an admixture of organisms as postulated by other workers. He suggests that both forms, although they have not yet been detected with certainty, may coexist in infected tissues and that the non-acid-fast elements may play an important role in the development of diseases caused by acid-fast bacilli.—R. E. GLOVER.

COWDRY, E. V. (1940). **Cytology of Acid-Fast Bacterial Diseases of the Leprosy Group.**—*J. R. micr. Soc.* **60.** 232–239.

C. studied the nature of the early sequences in the reactions of three different hosts (man, rat, and water buffalo) to infection by acid-fast bacilli of the leprosy group. Particular attention was paid to the so-called mononuclear theory of WHITE which postulates that resistance or susceptibility to infection is governed by the relative ability of the monocytes of a particular species to deal with the organisms; this, in turn, is dependent upon a chemical factor common to both through which they contend for the same food supply. He does not accept this theory in its entirety, pointing out that both polymorphonuclears and mononuclears merit consideration: moreover, although in susceptible individuals the monocytes and their derivatives are charged with bacilli for long periods, it is not possible to distinguish between living and dead organisms.

The problems of latency and specific treatment are also discussed.—R. E. GLOVER.

I. KARLSON, A. G., & FELDMAN, W. H. (1940). **Studies on Acid-Fast Bacterium Frequently Present in Tonsillar Tissue of Swine.**—*J. Bact.* **39.** 461–472.

II. FELDMAN, W. H., MOSES, H. E., & KARLSON, A. G. (1940). ***Corynebacterium equi* as a Possible Cause of Tuberculous-Like Lesions of Swine.**—*Cornell Vet.* **30.** 465–481.

I. Thirteen of 47 tonsils from pigs with localized tuberculous lesions and 11 of 47 tonsils from non-tuberculous pigs yielded an acid-fast bacterium which grew rapidly on glycerinated egg-yolk agar at 37·5°C. A study of its physiological, pathogenic, allergenic, and antigenic properties showed that it produced no apparent lesions in chickens, mice, or calves, caused localized caseating necrosis in g. pigs and rabbits by subcutaneous injection of large doses, sensitized g. pigs to avian tuberculin, and possessed antigenic components in common with the avian type tubercle bacillus and *Mycobacterium phlei*.

II. The submaxillary lymph nodes of 89 tuberculous pigs were examined histologically and cultured for the presence of tubercle bacilli and *C. equi*; 1 c.c. of each lymph-node suspension was injected intravenously into each of two rabbits and subcutaneously into each of two g. pigs. Twenty *C. equi* strains were isolated, seven being unassociated with tubercle bacilli. Histological examination showed that five of the seven lymph nodes, in which *C. equi* was demonstrable but tubercle bacilli were not, were definitely normal. The authors concluded that *C. equi*, although present in 20–25% of diseased submaxillary lymph nodes of swine, associated with tubercle bacilli, was also found in the same percentage of apparently normal submaxillary lymph nodes of non-tuberculous pigs and did not appear to be aetiologically related to tuberculosis-like adenitis of swine. In their opinion, a specific tissue reaction did not occur by which invasion of the tissues with *C. equi* could be distinguished from that with tubercle bacilli.—R. O. MUIR.

PLUM, N. (1940). **Corynebacterial Infections of the Cervical Lymph Glands in Swine.**—*Skand. VetTidskr.* **30.** 1211–1227. [In English].

P. discusses in considerable detail previous work relating to TB.-like lesions of the mandibular lymph nodes in pigs that have been ascribed to *Corynebacterium equi* infection. He then summarizes the results of his own investigations which were directed in particular to the following aspects of the subject. (1) The geographical distribution and course of the infection and its distribution in individual herds. (2) The diagnosis of the lesion, especially its differentiation from TB. lesions in the cervical lymph nodes. (3) Experimental studies on the virulence of *C. equi*, in particular for swine.

He states that from data gathered in Danish

bacon factories, the infection seems to be unequally distributed, but appears to be more common in large herds where the incidence may exceed 1%. There was no explanation for its insidious appearance and its subsidence. It was apparent that a certain diagnosis could not be made by naked-eye examination of lesions alone; a microscopic or histological examination or the isolation of the organism in culture was essential. As many as 60% of supposed cases of TB. lymphadenitis of the mandibular l.nn. in one abattoir proved on examination to be due to corynebacteria.

Feeding and inoculation experiments in swine suggest that the causal organism is almost non-pathogenic for pigs and that it assumes pathogenic properties only in the presence of some other infection. [See also *V. B.* **11.** 77.]—Gwilym O. Davies.

I. Lovell, R. (1937). **Studies on *Corynebacterium pyogenes*, with Special Reference to Toxin Production.**—*J. Path. Bact.* **45.** 339–355.

II. Lovell, R. (1941). **Studies on the Toxin of *Corynebacterium pyogenes*.**—*Ibid.* **52.** 295–303.

III. Carne, H. R. (1940). **The Toxin of *Corynebacterium ovis*.**—*Ibid.* **51.** 199–212.

I. Forty-five strains of *C. pyogenes*, isolated from a variety of lesions, were studied. All strains were shown to be pleomorphic Gram-positive rods which produce β-haemolysis in blood agar, clot and digest litmus milk, and liquefy gelatin, coagulated serum, and egg. Blood or serum aids growth but is not essential. Growth occurs aerobically, anaerobically, and in the presence of 10% CO_2. Other characteristics described include acid production without gas in glucose, maltose, lactose, xylose, fructose and arabinose (after one month). A few strains produce acid in sucrose, salicin, and mannitol.

In pathogenicity tests the intrapleural route is the most lethal. The g. pig is resistant to infection. Agglutination and absorption tests failed to reveal any differences connected with the species of the host or with the disease process. Five strains contained a major and minor antigen, but the great majority of strains possessed only the minor antigen and formed a homogeneous group.

A preliminary study of the haemolytic and lethal toxin showed that the toxin is relatively weak and forms an antigenic formol toxoid.

II. This paper is complementary to I, and deals with the best toxin-producing medium, the optimum time of growth, the preparation of alum-precipitated toxoid, and the immunizing effects of the latter in animals. After experiments with various media it was concluded that the addition of minced meat to broth is essential for toxin production, and details for the preparation of a successful medium are given. The maximum toxin, estimated as haemolysin, was present after 48 hours' incubation at 37°C., whereas the maximum viable count occurred after 40 hours. Suitable methods for concentrating the toxin by means of ammonium sulphate, for preparing alum-precipitated toxoid, and for estimating its *in vitro* combining power are described. Protocols show a marked rise in circulating antitoxin in rabbits and sheep as the result of the intramuscular injection of alum-precipitated toxoid. Mention is made of the use of this toxoid in the field and the hope is expressed that this product will be of value as a prophylactic and adjunct in the treatment of chronic cases of infection with *C. pyogenes*.

III. C. examined the toxicity of 200 strains of *C. ovis* and all were found to produce a soluble toxin, although potency varied. A detailed account is given of the preparation and concentration of the toxin, and its physical, chemical, and biological properties are recorded. The strains are grown in peptic digest broth in a shallow container under atmospheric conditions for five days at 30°C. Centrifugation follows and the toxic broth may be preserved by the addition of toluol, or the ammonium sulphate precipitate, as fully described, may be desiccated *in vacuo* and stored in the form of the resulting stable flakes.

A review is given of the pathogenic properties of this toxin in experimental animals, but it is emphasized that in natural infections of sheep in Australia, no evidence of acute intoxication has ever been observed, as the characteristic chronic abscess formation in superficial lymph nodes seldom causes perceptible interference with general health.

All the 12 strains examined in detail were found to be completely and equally neutralized by one specific antitoxin. A moderate but experimentally satisfactory antitoxin titre (2 units per ml.) was produced in a horse immunized with formol toxoid. Modified

techniques for studying and standardizing the toxin and antitoxin enabled C. to determine the antitoxin content of the sera of 90 naturally infected sheep, but experiments to evolve a diagnostic intradermal test for infected sheep were unsuccessful.—J. KEPPIE.

VACCARO, H., & ABEL, K. R. (1939). Linfoadenitis caseosa ovina en el territorio de Magallanes. Estudio bacteriológico del B. de Preisz-Nocard de origen magallánico. [**Caseous Lymphadenitis in Sheep in Magallanes Territory, Chile**]. —*G. Batt. Immun.* 22. 561–594. [In Spanish].

The authors isolated 15 strains of *Corynebacterium ovis* from sheep in Magallanes Territory and from sheep from the Falkland Islands.

They describe in considerable detail the characters of the organism and the lesions in the sheep.

GREY, C. G., OSTEEN, O. L., & SCHOENING, H. W. (1941). **Swine Erysipelas, The Agglutination Test for Its Diagnosis, and a Report on a Study of Arthritis in Swine.**—*Amer. J. vet. Res.* 2. 74–76.

Full details are given for the preparation of a crystal-violet *Erysipelothrix rhusiopathiae* antigen for use in a whole blood or serum rapid aggln. test on plates. A positive reaction consists of definite clumping of the antigen within 2 min. The authors believe that a positive reaction indicates either definite infection or exposure to the specific organism. Positive reactions in animals with no clinical symptoms may be caused by the presence of the organism in the tonsils or intestinal tract, or by obscure joint lesions which can only be detected by careful P.M. examination.

The test is more useful in herd diagnosis to detect the prevalence of infection than in individual diagnosis. Animals that have been treated with *E. rhusiopathiae* antiserum react strongly to the test and may continue to do so for some weeks after injection.

The authors also undertook a search for the specific organism in arthritic joints obtained from meat-packing centres. They examined 472 arthritic joints bacteriologically: 357 (75·6%) yielded *E. rhusiopathiae*. These joints were obtained from pigs widely distributed throughout the U.S.A.—D. L. HUGHES.

KARLSON, A. G., & MERCHANT, I. A. (1941). **The Cultural and Biochemic Properties of *Erysipelothrix Rhusiopathiae*.**—*Amer. J. vet. Res.* 2. 5–10.

In view of the growing realization in the U.S.A. of the veterinary importance of infections caused by *E. rhusiopathiae*, the authors studied 60 strains of the organism, paying particular attention to cultural and biochemical characteristics. A detailed description of these characteristics is given. These details will be reasonably familiar to most European workers. A resumé of the literature is also given.

—D. L. HUGHES.

SOEKARNO, R. (1940). Mededeelingen omtrent de algemeene malleinatie in de districhten Bblo en Dompoe van den ambtskring Raba. [**Mallein Tests Performed in Bolo and Dompoe, Raba District (Island of Sumbawa, Dutch East Indies)**].—*Ned.-ind. Bl. Diergeneesk.* 52. 259–280. [English and French summaries]. [Abst. from English summary].

In June and July 1939, 6,721 horses in the district of Raba were submitted to the mallein test. The results were 170 positive, 86 doubtful and 6,467 negative reactions. Autopsies were performed on 223 of these horses revealing 213 positive cases. Of the 223 animals slaughtered, 169 gave a positive mallein reaction (three negative P.M.), 34 gave a doubtful mallein reaction (six negative P.M.), 17 gave a doubtful mallein reaction but 16 gave a positive and one a doubtful complement-fixation reaction (all positive P.M.), and three gave a negative reaction but showed suspicious symptoms (one negative P.M.). Altogether 36 of the horses killed had shown clinical symptoms of glanders.

Because of the local conditions, glanders cannot be entirely eradicated, but the value of the mallein test and the importance of carrying it out on a large scale is amply demonstrated.

SISSOKO, B. (1940). Étude comparative d'une souche locale de "Pasteurella boviseptica". [**Study of a Local Strain of *Past. boviseptica* (Dahomey)**].—*Bull. Serv. zootech. Epiz. A.O.F.* 3. 87–92.

The strain described was isolated from an oedematous tumour [site not given: ? under the throat as occurs in bovine pasteurellosis in India] affecting an ox in Dahomey. S. summarizes the biochemical reactions of the strain on various media and gives an account of its

pathogenic effects on sheep, goats, calves, piglets, rabbits, monkeys (*Cercopithecus patas*), g. pigs, white rats, turtle doves, pigeons, and *gendarmes* [? weaver birds—*Ploceus cucullatus*].

The bovine type of pasteurella in French West Africa can be identified by :- (1) failure to grow in yeast-water, (2) great virulence for rabbits and *C. patas*, and (3) agglutination by a specific serum from an homologous strain.

—L. TOBBACK.

DE MOULIN, F. W. K. (1939). Onderzoek naar de oorzaak van shock na septichaemie-vaccinatie. [**The Cause of Shock after Vaccination against Haemorrhagic Septicaemia**]. — *Ned.-ind. Bl. Diergeneesk.* **51.** 153–217. [English and German summaries]. [Abst. from English summary].

Since mass immunization against H.S. was begun in the Dutch East Indies, there have been numerous cases of post-vaccinal shock among buffaloes and, to a lesser extent, among pigs. Each batch of vaccine is tested on rabbits to demonstrate the harmlessness of the vaccine. Attempts to arouse anaphylactic symptoms in rabbits and g. pigs with specific bacilli and perhaps toxins, gave negative results. Although rabbits showed no obvious reaction to injection of large doses of vaccine it appeared that buffaloes were especially sensitive to some toxic substance in the vaccine. The clinical features of this post-vaccination shock in buffaloes were severe dyspnoea and lung oedema, while the P.M. findings were dilatation of the heart, oedema of the lungs, and general venous stasis. Intravenous injections of specific broth cultures and germ-free filtrates given to normal, vaccinated and atropinized rabbits caused a sudden momentary fall of blood pressure followed by another fall of longer duration but of less severity. This reaction, together with some of the observed clinical symptoms, was thought to resemble that of histamine poisoning, and the presence of minute amounts of histamine was demonstrated in the formol vaccine. Injections of histamine-dihydrochloride and histamine phosphate were administered to horses, buffaloes, goats, and rabbits ; buffaloes appeared to be extremely sensitive as a dose of 0·1 mg. given intravenously caused a definite effect on the respiration. [This is surprising in view of the fact that the dose of histamine phosphate which can be administered to human beings is 0·5–2·0 mg. (United States Dispensatory—1940).] The P.M. observations in calves and rabbits killed by histamine corresponded with those found in buffaloes which had died in post-vaccination shock. In both cases histological examination showed that the coronary arteries were primarily affected and the changes found in the lungs and liver were regarded as secondary to those in the heart. From this evidence the author suggests that post-vaccination shock in buffaloes may be due to histamine rather than to an anaphylactic shock.

PASRICHA, C. L., & PANJA, G. (1941). **A Search for Latent Sylvatic Plague in Calcutta.**—*Indian med. Gaz.* **76.** 212–213. [Authors' summary copied *verbatim*].

Attention is drawn to the importance of latent plague in rodents and that infection of rodents with *P. pestis* can occur without any apparent gross lesions. This latent infection can be detected only by animal inoculation experiments. Although the results of the examination of a series of 200 rats have been negative for *P. pestis*, the findings of the work carried out in America are of sufficient importance to stress the necessity of further work on these lines. Further this survey must be extended to include other rodents.

KING, L. S. (1940). **Primary Encephalomyelitis in Goats Associated with Listerella Infection.**—*Amer. J. Path.* **16.** 467–478.

This paper gives a detailed description of the histopathology of listerella encephalomyelitis in a series of nine goats, from an outbreak observed by TEN BROECK & SEASTONE in 1936 [unpublished report]. The clinical course of the disease, which lasted 2–3 days, showed nothing distinctive, specific neurological signs being rare. The principal lesion (0·075 mm.–1·0 mm. in diameter) was a focal collection of mononuclear cells usually in close relation to a blood vessel. The latter consistently showed degenerative changes. Nerve cells were sometimes destroyed, but there was relatively little necrosis. Meningitis was generally slight and where observed it was usually secondary to parenchymal damage. The lesions were essentially restricted to the brain stem, especially the medulla and spinal cord. The cerebellum was never affected. Bacteria were distributed according to the lesions.

K. suggests that the lesions show a greater resemblance to the changes observed in rickettsial infections such as typhus and Rocky Mountain fever and to toxoplasmosis than to the changes associated with the neurotropic viruses. It must also be appreciated that numerous workers have endeavoured to reproduce listerella encephalitis, but whatever the inoculation route used, a meningo-encephalitis or a meningitis has resulted and thus Koch's postulates have not been fulfilled.—J. S. P.

PATERSON, J. S. (1940). **Studies on Organisms of the Genus Listerella. IV. An Outbreak of Abortion with the Recovery of Listerella from the Aborted Foetuses.**—*Vet. J.* **96.** 327–332. [For previous parts, see *V. B.* **9.** 606, and **11.** 745].

GRAHAM *et al.* [*V. B.* **10.** 577.] found listerella infection causing bovine abortion in the U.S.A. P. now reports ovine abortion due to listerella in Northamptonshire, and records experimental findings relative to the strains isolated.

Among a mixed flock of 92 Dorset Horn and 18 cross-bred ewes all abortions occurred in the shearlings (32) which had been pastured separately from March–August 1938, run with the older ewes during the mating season, and again separated after October. No previous history of ovine abortion was known. Abortions started at mid-December, 1938 (lambing first due at end of January, 1939) and continued until mid-February. Some 16 ewes aborted or produced dead lambs. Four premature lambs were successfully reared. Abortions had ceased before this investigation was started. Swabs from the cervix of six ewes (the last to abort) were negative for listerella and agglutinins were not present in the sera of four aborters, four contact ewes and two ewes of the main flock. No abnormalities could be found in the 16 aborters nor were listerella recovered at slaughter in March. Gram-positive bacilli, considered to belong to the genus *Listerella*, were isolated from three out of four of the foetuses examined; these organisms produced an abnormally wide β haemolysis when isolated, but after nine months' artificial culture this became normal. No true O agglutinin production was demonstrated in rabbits except to a slight degree after nine months' subculture. Xylose was fermented but rhamnose was not.

Intravenous injection into pregnant ewes led to localization of the bacteria in the uterus, foetus, and foetal membranes and to abortion between 7–12 days after dosage. Oral dosage of three heavily pregnant ewes produced no symptoms of disease and neither lesions nor bacteria were found in the ewes (killed soon after lambing) or their lambs.—C. V. WATKINS.

DELAPLANE, J. P., & STUART, H. O. (1941). **An Atypical Type of H. gallinarum (Infectious Coryza) Infection in Chickens.**—*J. Amer. vet. med. Ass.* **98.** 501–502.

Haemophilus gallinarum was isolated in two outbreaks of disease in which the clinical symptoms differed from those usually observed in infectious coryza.

In one instance in which a group of about 300 young birds some nine weeks old were affected, the clinical characters were suggestive of infectious bronchitis, including listlessness, loss of weight, and coughing. A few birds showed nasal discharge and in two only was swelling in the region of the head seen.

—W. J. IRONSIDE.

GRÜNBART, K. (1939). Beiträge zur biochemischen Differenzierung der Paratyphusbakterien von den paratyphusähnlichen Mikroorganismen. **[Biochemical Differentiation of Paratyphoid Bacteria].**—*Wien. tierärztl. Mschr.* **26.** 555–556.

A summary of a dissertation from the veterinary college in Vienna. Comparison of cultural behaviour of 121 strains of paratyphoid bacteria and 67 strains of similar organisms was made, from which it was concluded that rapid differentiation is much facilitated by inclusion of citrate agar and salicin broth in the series of media. No typical *Salmonella paratyphi* decomposed salicin within three days whereas most of the organisms with which it might be confused did so.—H. H. GREEN.

I. PIKE, R. M., & MACKENZIE, G. M. (1940). **Virulence of *Salmonella typhimurium*. I. Analysis of Experimental Infection in Mice with Strains of High and Low Virulence.**—*J. Bact.* **40.** 171–195.

II. MACKENZIE, G. M., PIKE, R. M., & SWINNEY, R. E. (1940). **Virulence of *Salmonella typhimurium*. II. Studies of the Polysaccharide Antigens of Virulent and Avirulent Strains.**—*Ibid.* 197–214.

I. A study was made of the virulence of four strains of *S. typhi-murium*, two S and two R, one being an R variant of one of the S strains. Groups of 25 mice, belonging to three strains of varying resistance, were injected intravenously with standardized suspensions of 18-hour agar cultures. As possible determinants of virulence, estimations were made for each strain of invasiveness, resistance to phagocytosis, and ability to survive and to multiply in the mouse. The increase in mortality, obtained amongst Swiss mice by increasing the dosage of *S. typhi-murium* strains with a wide range of virulence, proved much more rapid within a certain range than has been indicated by previous workers. Results suggested that the slope of dose-mortality curves depended more upon the degree of uniformity of susceptibility of the test animals than upon infective capacities of the test cultures. It was not found possible to plot a dose-mortality curve applicable to all strains of *S. typhi-murium* tested under various circumstances. Great difference in the virulence of strains was shown to be obscured by testing in highly susceptible mice over a narrow dose range. A record of the mean survival time was found to give valuable information regarding virulence and host susceptibility not apparent from total mortality figures. A highly virulent S strain and one of low virulence, identical in cultural, serological, immunizing, and toxigenic characters, as well as in invasiveness and resistance to phagocytosis, differed only in the ability of the virulent strain to multiply in the host. An avirulent R strain, although much less invasive than the S strains and exhibiting very little capacity to multiply in the host, survived longer in the spleen.

II. Polysaccharide antigens were extracted from the four strains of *S. typhi-murium* used in I by the method of RAISTRICK & TOPLEY, by that of BOIVIN & MESROBEANU, and by distilled water at 60°C. Qualitative and quantitative chemical analyses of these polysaccharides detected only minor differences. An estimate was made of toxicity by intraperitoneal injection of mice, of the capacity to induce antitoxic immunity in mice, and of the most effective doses for the production of active immunity to *S. typhi-murium* infection. Serological analyses of the polysaccharides from the S and R strains were compared, and that obtained from an R strain proved to be a complete antigen and quite different serologically from those of the smooth strains. Polysaccharides prepared by different methods from two S strains of *S. typhi-murium* of different virulence, although serologically identical, showed differences in toxicity and immunizing capacity. The authors concluded that the S polysaccharide antigen of *S. typhi-murium* was not the major determinant of virulence and that the important determinants of virulence were serologically inactive.

—R. O. MUIR.

CAMERON, G. R., DELAFIELD, M. E., & WILSON, J. (1940). **Pathological Changes Produced in Rats and Mice by a Toxic Fraction Derived from Bact. typhi murium.**—*J. Path. Bact.* **51.** 223–233.

Intraperitoneal injection of a fraction obtained from dead *Salmonella typhi-murium* by tryptic digestion followed by alcoholic precipitation, produced in the liver of mice and rats congestion of the portal veins, sometimes with haemorrhage and thrombosis, and necrosis, chiefly of peripheral and mid-zonal distribution. Malpighian bodies in the spleen and follicles of lymph nodes also underwent necrosis. These changes were accompanied by a rapid decrease in liver glycogen and blood sugar.

The absence of demonstrable pathological changes in endocrine glands controlling carbohydrate metabolism suggests that the carbohydrate disturbances so produced were hepatic in origin.

Infection of mice with *S. typhi-murium* gave rise to similar changes, though in these animals thrombosis of the portal veins was more frequent and necrosis of the hepatic cells more extensive.—J. W. WHITTICK.

LARRAT, R. (1940). Affection généralisée du chien à bacille pyocyanique. **[Generalized *Pseudomonas pyocyanea* Infection in the Dog].**—*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 75–79.

Ps. pyocyanea has often been observed as a cause of local lesions in dogs at Dakar. L. describes the symptoms shown by one case, from the heart blood of which a strain was obtained that was pathogenic for g. pigs, rabbits, and dogs.—L. TOBBACK.

HUDDLESON, I. F. (1941). **Progress Made in the Study of Brucellosis During the Past 25 Years.**—*J. Amer. vet. med. Ass.* **98.** 181–188.

This short review is unsuitable for abstraction but will repay reading in the original. General points made by the author are that younger workers pay too little attention to the older literature and consequently are apt to study questions already adequately answered, and that many of the ascertained facts are not made use of in practice. Critical comment is made on the more important chapters in our knowledge of brucellosis of cattle, particular attention being paid to the route of infection and the infective dose, the segregation or slaughter policy as a method of control, vaccination in calfhood or later, and the isolation of a fraction of the bacillus capable of immunizing. Brief reference is made to brucellosis of swine, and the section on undulant fever is devoted chiefly to questions of diagnosis, and of therapy by means of members of the sulphanilamide group, antiserum, or brucellin, the latter being regarded as of considerable value.—A. W. S.

Andrieu, A., & Casos, G. A. (1940). El aborto infeccioso de los bovinos. Enfermedad de Bang o brucelosis bovina. [**Bovine Contagious Abortion**].—*Bol. Fom. Ganad., B. Aires.* **5.** No. 17. pp. 54.

This is a review of present knowledge, with instructions to stock owners on methods of prophylaxis and immunization. Owners are instructed about the collection of material for diagnosis etc.—Miller Watson.

Olson, Å. (1940). Något om diagnostiken av Brucella abortus Bang vid inträffade kastningsfall. [**Diagnosis of Bovine Brucellosis in Cases of Abortion**].—*Svensk VetTidskr.* **45.** 160–170.

O. reviews various methods which have been recommended by different workers to diagnose the true cause of abortion in cattle. In comparative tests, carried out at the abortion laboratory of the Veterinary Bacteriological Institute, with the g. pig inoculation method on 126 samples of placental material, microscopic examination of preparations appropriately stained with methylene blue and differentiated proved to be 80% reliable, giving only false negative results and no false positive ones. Another staining method, that of Hansen & Köster [*V. B.* **7.** 321.], is, however, regarded as even better, according to preliminary trials.

The blood agglutination test on cows at the time of abortion has been shown by other workers to be of limited value. The blood titre sometimes sinks before abortion and has been known to be negative in cases where examinations of placenta have been positive.

O. carried out blood aggln. tests and microscopic examinations of placenta in 1,110 cases of abortion. Results agreed closely, positive results being obtained with 288 of the aggln. tests and with 267 of the placenta examinations. 90% of the reacting aborters were excretors of brucella in the placenta, and the number of excretors which reacted negatively was only 1·4%.

For routine laboratory diagnosis, O. recommends that a good sample of placenta as well as a blood sample should be collected by practitioners and sent for examination.—J. E.

—. (1940). **Report of Committee on Bang's Disease.**—*J. Amer. vet. med. Ass.* **97.** 503–505.

In the Federal Bang's Disease Control Scheme, 1,600,000 herds containing 12,300,000 cattle were under supervision in 1940. Of these, 55,000 herds containing 1,100,000 cattle are officially approved as disease free.

The need for uniform inter-state legislation is emphasized, and it is suggested that low agglutination reactions (partial aggln. at 1 : 50) should not disqualify cattle for inter-state movement if they come from a clean herd.

Eight recommendations with regard to calfhood vaccination with the attenuated strain 19 are given. The vaccine is recommended if applied under proper supervision. The committee point out the necessity for adequate federal and state financial support for indemnity purposes, and refer to the success of past research and the need for future research.

—J. E.

—. (1941). **Report of the Committee on Bang's Disease of the United States Live Stock Sanitary Association.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 102–106. Discussion pp. 106–109.

On October 1st, 1940, approximately 12,588,000 cattle in 1,680,500 herds were under supervision in the "Bang's disease project" of the U.S.A.

Calfhood vaccination, in suitable circumstances, is now recommended by the United States Bureau of Animal Industry as a preventive measure against the disease.

Previous experience has shown that greater uniformity of brucella control inter-state regulations is necessary. Suggestions for new regulations are given.

More stringent control of the sale of brucella vaccine and antigen is advocated.—D. D. O.

WILLIAMS, W. L. (1940). **The Control of Bang's Disease by Slaughter.**—*Vet. Med.* **35**. 436–446.

This article contains a criticism of the official test and slaughter policy of the United States government for the eradication of Bang's disease. W.'s main contention is that the policy involves the farmer in financial loss, despite the official compensation, and that the scheme is, in practice, almost compulsory in view of the many financial penalties attached to non-tested herds.

He considers that eradication could be more easily accomplished by greater attention to breeding hygiene and clinical examination.

[W. appears to ignore most of the proved experimental knowledge of the disease and seems to have a definite bias against bacteriological methods of controlling the disease.]

—D. L. HUGHES.

I. KNAPP, J. V. (1941). **Progress of Bang's Disease Work in the Southeastern States.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* 59–65.

II. BIRCH, R. R. (1941). **The Handling of Bang's Disease.—A Report of Progress.** —*Ibid.* 65–72.

III. ROSENBERGER, M. (1941). **A Dairyman's Experience in the Eradication of Bang's Disease.**—*Ibid.* 73–78.

IV. MCGREGOR, W. A. (1941). **A Beef Breeder's Experience With Bang's Disease.**—*Ibid.* 78–84.

I. Control of bovine brucellosis was inaugurated in the southeastern states in 1934. The average infection in the area at that time was 6·92%. By 1940 the incidence had been reduced to 3·12%. Eight of the 12 states in the group confined their activities to the test and slaughter method. The other four regularly tested all supervised herds and in addition vaccinated calves. The chief obstacle to complete eradication was the importation of cattle for replacements.

II. In an experiment begun in 1936 to test the efficacy of strain 19 *Brucella abortus* vaccine, 35 calves between 4–8 months old were inoculated. Together with 23 controls they were exposed in a pen, during the last six months of pregnancy, to virulent natural infection. The animals were observed during their first and second pregnancies and were subjected to monthly agglutination tests. The calf crop among the vaccinated animals was 98·6% as compared with 75·5% among the controls. At the end of the first and second pregnancies 8·6% and 20% respectively of the vaccinated animals were reactors. It is concluded that calfhood vaccination is effective under field conditions, but that its beneficial effect tends to disappear if the animals are continually exposed to infection.

III. Although reactors were removed each month and strict hygiene was enforced, the test and segregation method of eradication was a complete failure in a large group of dairy herds in California.

Vaccination of heifers, 5–9 months old, with 5–10 c.c. of strain 19 vaccine has given indefinite results. No spread of disease, however, has resulted from mixing such heifers with the negative herds and all show milk serum agglutination tests negative in dilutions of 1 : 5 or more.

By adding vaccinated heifers and gradually slaughtering reactors it is anticipated that the infected herds will be free in a few years.

During the last two years 0·6% of vaccinated heifers and 4·4% of unvaccinated controls in the brucella-free herds have reacted. 4% of the vaccinated heifers in the infected herds were reactors.

The use of vaccine on reacting cows had neither beneficial nor harmful results.

IV. In a large beef herd in Maryland, test and segregation methods have never completely eradicated the disease. Over several years, however, negative groups of heifers have been built up. By adding tested unserved heifers only it has been possible to keep these groups negative during the last 4–5 years. In the positive herd only the highest quality breeding cows are retained. The calves run with their dams for 6–7 months, are tested 30–40 days later, and are not added to the negative groups until two further tests have been made at an interval of 30 days. Reactors among the calves are very rare. Practical results to date have been satisfactory. Official recognition and adoption of calfhood vaccination as a means of eliminating the disease is advocated.—D. D. OGILVIE.

GIANI, C. (1939). Epidemia circoscritta di febbre ondulante di origine bovina. [**A Localized Outbreak of Undulant Fever of Bovine Origin**].—*Ann. Igiene (sper.).* **49.** 597–608. [Abst. in *Bull. Hyg.* **14.** 872, copied *verbatim*. Signed: H. H. S.]

In Val Polcevera, Genova-Bolzaneto district, a small outbreak of undulant fever arose; there were altogether eleven persons attacked, and the disease started from a stall in which a cow aborted. Attendants, lodgers, farm-hands were attacked and the infecting organism was *Br. abortus bovis*. Two of the eleven had indirect contact only with the stall in question and one lived a long way off. This was a peasant woman who purchased a milch-cow which had been stabled in the stall where the cow had aborted. She fell sick, although there were no cases in her district.

PANDALAI, N. G., & RAMAN, T. K. (1941). **Brucella Infection in Vizagapatam.**—*Indian med. Gaz.* **76.** 327–329. [Authors' summary copied *verbatim*].

1. Six cases of undulant fever were discovered in Vizagapatam. 2. *Br. melitensis* was isolated from three of the cases; the other three showed a high agglutinin titre against this organism. 3. Two cases occurred in butchers dealing with goats and sheep. In other cases the source of infection could not be traced.

DEL VECCHIO, G. (1938). Contributo sperimentale allo studio della profilassi immunitaria antibrucellare. [**Immunization against Brucellosis**].—*G. Batt. Immun.* **20.** 1208–1218. [English, French and German summaries].

The author used a brucellin prepared by cultivating *Br. melitensis*, *Br. abortus*, *Br. paramelitensis*, and *Br. para-abortus*, in mixed culture in broth. After 20 days' growth at 37°C. the broth was filtered, 0·6% formol added, and the filtrate returned to the incubator and kept at 37°C. for one month.

The brucellin was administered to g. pigs in three doses of 0·25, 0·5, and 1·0 c.c. given subcutaneously at intervals of one week. The g. pigs were over 300 g. body weight and gave negative agglutination reactions. One month after the brucellin had been given the g. pigs received a mixed, live culture of brucella intraperitoneally, and control animals were also injected. The treated animals were much more sensitive to infection than the control animals.

The author discusses the development of susceptibility rather than resistance after some methods of immunization.—MILLER WATSON.

EICHHORN, A., MINGLE, C. K., & MURDOCK, F. M. (1940). **The Behavior of Brucella Abortus Vaccine in Various Excipients.**—*Amer. J. vet. Res.* **1.** 3–17.

The authors studied the effect of various excipients on *Br. abortus* strain 19 *in vivo* and *in vitro*. The excipients included normal saline, liquid paraffin, oil of sweet almonds, lanolin, saponin, and cholesterol, and certain mixtures of these. Tables are given showing (1) the viability of the organism at incubator, room, and refrigerator temperatures for periods up to seven weeks, (2) the reaction produced and the possibility of recovering *Br. abortus* from vaccinal sites in cows or yearling steers after periods up to five months, (3) the local reactions, agglutinin titres, and possibility of recovering the organism after various periods in inoculated rabbits, and (4) the virulence of strains obtained from vaccinated cows after various periods.

Unexpected differences were found between the effects of various excipients *in vitro* and *in vivo*, *e.g.* whilst suspensions in 50% lanolin in liquid paraffin were sterile within 96 hours at 37·5°C. *in vitro*, viable brucella were isolated from vaccinal sites 85 days after inoculation of identical suspensions.

Pronounced differences were found *in vitro* at incubator temperatures, similar effects of less degree being noted at lower temperatures. Lanolin and liquid paraffin mixtures produced rapid sterilization at all temperatures, the rate appearing to run parallel with the percentage of lanolin present. Oil of sweet almonds containing cholesterol showed a similar action but of less degree, seven days at 37°C. being necessary before sterilization was complete. Viability was maintained for longer periods in oil of sweet almonds alone (14 days), liquid paraffin containing cholesterol (4–5 weeks), liquid paraffin alone (six weeks), and 1 or 2% saponin or saline (over seven weeks).

For the experiments in cows (14 in number) the same numbers of organisms were injected in various volumes of excipient at four different sites and material was aspirated with a syringe after various periods, or a small biopsy made.

In general a rise of about 3°F. in body temperature with subsidence within three days

was observed irrespective of the excipient used. Differences were found in the persistence of local reactions, but not in their initial intensity, which usually reached its maximum in 4–6 days. Lesions from vaccines in saline were resorbed within about 14 days; resorption of those from 4 or 6% cholesterol in liquid paraffin took about 65 days, and of those from 50% lanolin in the same vehicle over five months. Recovery of viable organisms from the vaccinal sites showed some irregularity, but outstanding findings were the rapid disappearance in the case of liquid paraffin or oil of sweet almonds alone, the long period of viability in the case of saline (up to 65 days) and lanolin-paraffin mixtures (up to 65 and 73 days) and the period of 3–5 months for cholesterol-paraffin mixtures, large numbers being recovered in two out of three cases for periods up to nearly three months.

For the experiments on heifers (18 in all) only three vehicles were used, *viz*, saline, 1% saponin, and 2% cholesterol in liquid paraffin. Results were similar to those given above for cows. Frequent agglutination tests made on these animals showed no significant difference in the average titre produced by the three vaccines.

The same vaccines were used for rabbits and the results obtained again showed marked localization and persistence of lesions from the 2% cholesterol-paraffin mixture. Brucella were recovered up to 44 days in the case of saline and 1% saponin vaccine and in large numbers for more than 55 days (the longest period recorded) in the case of 2% cholesterol-paraffin. Two rabbits given saponin and cholesterol vaccines respectively showed a much more persistent agglutinin response than one given a saline vaccine.

Virulence tests made in g. pigs with strains recovered from ten cows after periods varying from 59–97 days showed no enhancement of virulence. On the basis that retarded antigen absorption may induce increased immunological response, it is suggested that 2% cholesterol in liquid paraffin, which caused circumscribed and persistent local reactions from which brucella could be cultivated for over five months, deserves further study as an excipient for brucella vaccines.—A. W. S.

McEwen, A. D. (1941). **Problems Relating to the Immunization of Cattle against *Br. abortus*.**—*Vet. Rec.* **53**. 237–239.

In using an immunization method for control of brucellosis, consideration must be given to the variable susceptibility of female cattle at different periods of life and to differences in the virulence of the strains of *Brucella abortus* used. It has been generally agreed that strains of low virulence do not immunize as effectively as those of moderate or high virulence, but the author suggests that titration of the virulence of vaccine strains, merely by the lesions produced in g. pigs, is misleading. He states that R strains, some of which produce no serum agglutinins, may be more virulent than S strains which do so, and that it has not yet been proved that small variations in virulence are all reflected by the titre of serum in inoculated animals.

The author has found records of only 31 calves that have been vaccinated with strain 19 and later experimentally infected, 18 of which were tested for immunity at their first pregnancy and 13 at their second. Of the latter, five became infected by (three aborting), and eight were resistant to the test dose. In the other 18 calves, tests of immunity during the first pregnancy probably reinforced the immunity during the next pregnancy and in no case is there any evidence that an immunity was developed in these calves superior to that of animals vaccinated later in life.

The chief reasons for popularization of calfhood vaccination in the U.S.A. appear to be that it is compatible with the policy of slaughter of reacting adult cattle (because serum agglutinins at the time of first calving are either absent or of low titre), that no other method with these advantages seems to be available, and that some resistance to infection is produced.

The author makes the following suggestions:–every vaccine should be tested for infectivity on a sufficient number of cattle before it is used in the field; it should have its immunizing properties proved; it should cause no lasting agglutination reaction (some R strains fulfil this condition); vaccine strains should be stored *in vacuo* to maintain them unaltered; small animals should be used to test the properties and virulence of vaccines at frequent intervals; cattle should be used more extensively for experimental tests, and the epizoology of the disease as it is affected by varying herd management should be fully considered.

—C. V. Watkins.

I. Mohler, J. R., Wight, A. E., & O'Rear, H. M. (1941). **Calfhood Vaccination as an Aid in Coöperative Bang's Disease (= Bovine Brucellosis) Control.**—*J. Amer. vet. med. Ass.* **98**. 1–9.

II. Rabstein, M., & Welsh, M. (1941). **Field Experiments in Bang's Vaccination.**—*Ibid.* 268–277.

III. Haring, C. M., & Traum, J. (1941). **Vaccination to Control Brucellosis in Cattle.**—*Ibid.* 278–284.

I. In the course of this article various control measures for the disease are discussed historically. Among such measures are mentioned chemotherapy, segregation methods, the test-and-slaughter programme, and vaccine and serum therapy. Calfhood vaccination is treated in some detail. After a description of the original experimental work in calves by Cotton and Buck which led to the use of strain 19, details are given of field tests with this vaccine. The trials began in January 1936 in approximately 260 infected herds in 24 states. Up to December 1940, 17,000 calves of 5–7 months had been vaccinated, and many of these had subsequently undergone up to four pregnancies. 96·2% of the parturitions were normal, and 3·8% ended in abortion. Of the animals which calved normally, 82·9% were negative to a post-parturition test, 5·1% were positive, and 12% were suspicious reactors. Of those which aborted, 58·7% were negative to the post-parturition test, 31·9% were positive, and 9·3% were doubtful. On the basis of the agglutination test, only 1·6% of the abortions could be attributed to brucellosis. The incidence of natural infection in these herds as revealed by the agglu. test was 5,531 (29·2%) at the commencement of the trials. Of these reactors, 24·1% were still in the herds in July 1940. The vaccinated animals were therefore considered to have been exposed to severe natural infection as no other methods of control were attempted.

Owing to probable diversion of funds caused by the international situation, the U.S. Bureau of Animal Industry considers that calfhood vaccination might be used in conjunction with the official test-and-slaughter policy. In connexion with this, some general administrative rules are listed.

II. This article summarizes an investigation started over five years ago in 11 herds to test the value of *Br. abortus* vaccines in the control of the disease. These herds were of all types and had varying degrees of infection, from as low as 6·5% up to 100% of positive reactors, with an average percentage of 36·2. The reactors were retained in the herds. In 1934 commercial vaccines were used, but since that year strain 19 vaccine has been used.

Three different age groups were vaccinated, *viz*, 642 animals of 3–8 months, 89 of 9–12 months, and 65 of 13–21 months. There was a direct relationship between the age of the animal at vaccination and the length of time for which a positive blood reaction persisted. The younger the animal the shorter the duration of the positive blood reaction. Out of the total number of pregnancies 10 (1·5%) ended in abortions, five of these being due to infection with *Br. abortus*.

There appears to be no evidence that vaccinated calves transmit infection to susceptible animals. Strain 19 does not become established on the premises, or gain in virulence by passage in susceptible animals. The best age for vaccination is 4–8 months, the blood of such animals rapidly losing its positive titre. Strain 19 does not establish itself in the udder of vaccinated animals.

III. The authors, as a result of their experience with strain 19 vaccine, attempt to answer some of the questions which have arisen following its widespread use.

Vaccination with strain 19 gives a high degree of protection. This has been proved in controlled inoculation experiments and vaccination trials in the field, in which 94·1% of full-term calves resulted from vaccinated cows in infected herds. This percentage is somewhat higher than that obtained in herds free from brucellosis.

In a herd with 44% infection the disease disappeared in six years of calf and heifer vaccination, although the infected cows were retained in the herd.

The blood sera should be tested at the time of vaccination and 3–6 weeks after vaccination to assess the antigenic value of the vaccine. Although non-pregnant vaccinated heifers may have their resistance increased by association with infected aborting cows, such contact after the third month of pregnancy may overwhelm the resistance given by the vaccine and result in clinical infection.

The length of time that agglutinins persist after vaccination depends on the age at vaccina-

tion, subsequent exposure to virulent *Br. abortus*, and the relative proportion of S and R organisms in the vaccine. Vaccines may differ in the proportion of S and R organisms and such variations may affect the antigenic and pathogenic powers of the vaccine. Until these variations can be controlled there must be some degree of experimentation in the use of strain 19.—D. L. HUGHES.

LYON, B. M. (1941). **Bang's Disease with Special Reference to Control by Vaccination.**—*J. Amer. vet. med. Ass.* **98.** 363–368. Discussion p. 368.

L. discusses methods of control and vaccination. He states that in the U.S.A. the test and segregation plan has failed chiefly because facilities are inadequate and reinfection too frequent. Calf vaccination is favoured because calves vaccinated at the age of 4–8 months lose their agglutinins earlier and more regularly than older calves. With few exceptions, calves vaccinated at this early age lose their agglutinins completely or retain them in very low titre by the time they reach the reproductive age. The occasional animal which fails to return to normal may be eliminated by blood test. Vaccinated calves possess an increased resistance and, when placed in disease-free herds, do not present an infection hazard, since the avirulent cultures have not been recovered from such animals.—S. J. GILBERT.

KOLMER, J. A., BONDI, A., Jr., & RULE, A. M. (1940). **The Results of Active Immunization of Mice and Rats with Heat-Killed Vaccines of Br. abortus and Br. melitensis.**—*J. infect. Dis.* **67.** 268–274.

Previous work by the authors showed that the inoculation of rabbits with heat-killed brucella vaccines resulted in the formation of agglutinin, bacteriotropin, and protective antibody which passively immunized a large percentage of mice against fatal infection following intra-abdominal inoculation of virulent strains. In the present work mice and rats were immunized with heat-killed vaccines of *Br. abortus* and *Br. melitensis* and tested for immunity by intra-abdominal inoculation. 55·2% of mice inoculated subcutaneously with heat-killed *Br. abortus* vaccine survived the intra-abdominal inoculation of a lethal dose of virulent *Br. abortus* and 55·2% also survived a similar inoculation of *Br. melitensis*. 78·6% immunized with heat-killed *Br. melitensis* vaccine survived inoculation with *Br. melitensis* and 53·3% survived inoculation with *Br. abortus*. Thirty-four controls all succumbed to the infecting doses. 62·6% of rats vaccinated with *Br. abortus* survived inoculation with virulent *Br. abortus* and 58·3% with virulent *Br. melitensis*. Of rats vaccinated with *Br. melitensis*, 91·7% survived inoculation with virulent *Br. melitensis* and 66·6% with virulent *Br. abortus*. Three of 16 control rats inoculated with *Br. abortus* survived, while of 16 inoculated with *Br. melitensis* none survived.—S. J. G.

HENDERSON, D. W. (1940). **The Somatic Antigens of the *Cl. welchii* Group of Organisms.**—*J. Hyg., Camb.* **40.** 501–512.

H. studied the antigens of representative strains of the four types of *Clostridium welchii* and made several interesting findings. The technique which he used with successful results for agglutination tests with anaerobes is described in detail. A heat-stable O antigen was present in all *Cl. welchii* strains, and certain strains of Types B and D also possessed a heat-labile somatic component. Strains of Types B, C, and D were particularly examined. The following results were obtained. It was confirmed that the O antigen of Type A strains is strictly strain specific. The Type B (L.D. bacillus) strains isolated in Great Britain shared an identical O antigen, but a strain from South Africa had a strictly specific O component. The O antigen of the Type C (*Cl. paludis*) strains isolated in Great Britain was identical. The O antigens of strains of Type D (*Cl. ovitoxicum*) formed a diverse group. Cross O reactions between the various types were negligible or entirely absent.

Although the heat-labile (L) agglutinogen was only present in strains producing the ϵ toxin, experiments failed to show a relationship between the antigen and the toxin.

Colony variants occurred among strains of each type and stable variant forms were studied for their antigenic structure and toxins. Briefly, they were characterized by loss of the antigen specific for the parent strain, but they still produced toxins typical of the type to which the parent belonged.—J. KEPPIE.

NAGLER, F. P. O. (1941). **The Estimation of the Combining Power of *Cl. welchii* (Type A) Toxoid.**—*J. Path. Bact.* **52.** 105–110.

A useful *in vitro* method for evaluating *Clostridium welchii* (Type A) toxoid is given, based on the reaction between the toxin and human serum. The antigenicity of the toxoid is obtained in terms of antitoxin units, by calculating the amount of antitoxin which the toxoid deviates from the subsequent neutralization of a known amount of added toxin. The degree of opalescence is read after overnight incubation.

Fresh or dried toxoids may be tested. In a few experiments alum precipitation did not alter the combining power of toxoids, and it made them more heat stable.

The superiority of alum-precipitated *Cl. welchii* toxoid over ordinary toxoid in the stimulation of antitoxin production in rabbits is confirmed.—J. KEPPIE.

PIENING, C., & MAHLAU, E. (1939). Die ätiologische Bedeutung der anaëroben Sporenbildner bei der Fleischbeschau und den plötzlichen Todesfällen der Schafe. [**Anaerobic Diseases of Sheep in Relation to Meat Inspection**].—*Berl. Münch. tierärztl. Wschr.* Nov. 24th. 695–699.

The authors examined for anaerobes the tissues of 100 sheep, 82 of which were referred for bacteriological meat inspection according to the German meat-inspection regulations and 18 sent for general diagnosis of cause of death. Zeissler's dextrose blood agar plates were used. Anaerobes were isolated from 56 of the former group, *Cl. welchii* predominating among the 376 anaerobic strains recovered. The liver was the commonest site, followed in order by the spleen, kidneys, hepatic lymph nodes, musculature, internal iliac l.nn. and prescapular l.nn. Anaerobes were isolated from all the 18 sheep of the latter group and in much the same order of frequency in the various tissues as in the former group. The significance of the findings in relation to the history of the animals is discussed.—D. L. ROBARTS.

—. (1939). **Winter or Stable Blackleg.**—*Rep. Ont. vet. Coll. 1938.* pp. 39–40.

In only one of four cases of blackleg among stabled animals was *Clostridium septicum* isolated. It is pointed out that this is contrary to the statement on p. 253 of "Veterinary Pathology and Bacteriology" [GAIGER & DAVIES. (1938). London: Baillière, Tindall & Cox. (2nd Edit.)], which states "Cl. septique is the cause of clinical blackquarter in housed cattle".—J. A. GRIFFITHS.

MCINTOSH, R. A. (1939). **Botulism in Horses.**—*Rep. Ont. vet. Coll. 1938.* pp. 57–58.

This is a clinical account giving a brief description of an outbreak. There were eight horses on the premises; five were affected and three died. It is stated that the history, circumstances, and clinical picture definitely indicated food poisoning or botulism.—J. A. G.

I. ABEL, J. J., & CHALIAN, W. (1938). **Researches on Tetanus. VIII. At what Point in the Course of Tetanus does Antitetanic Serum Fail to Save Life?**—*Johns Hopk. Hosp. Bull.* **62.** 610-633.

II. ABEL, J. J., FIROR, W. M., & CHALIAN, W. (1938). **Researches on Tetanus. IX. Further Evidence to Show that Tetanus Toxin is Not Carried to Central Neurons by Way of the Axis Cylinders of Motor Nerves.**—*Ibid.* **63.** 373–403.

I. The authors conducted experiments on dogs and monkeys, injected with graded doses of tetanus toxin, which subsequently received antitoxin at regularly spaced intervals. Whilst it was found that once symptoms of descending tetanus were manifest, serum was powerless to prevent the fatal issue, there was no support to the theory that an impenetrable blood-brain barrier prevents circulating tetanus antitoxin molecules from reaching and neutralizing fixed toxin, for, contrary to the usual belief, even in the highly susceptible monkey, tissues which had fixed many lethal doses of toxin could be prevented from showing signs of tetanus if serum was given at a certain stage. Following the injection of 1–3 lethal doses of toxin, serum was effective up to the 40th hour; with ten doses this interval was reduced to 24 hours, irrespective of the amount of serum injected. It was evident, however, that the penetration of cells by toxin does not necessarily prevent antitoxin from exerting its effect.

II. This article is essentially a critical review of experiments by DOERR and his co-workers purporting to show that tetanus toxin is not carried by the bloodstream but is absorbed by the motor nerve terminals of the voluntary muscles and transported to the central neurons by way of the axis cylinders. The authors give details of a large number of experiments which refute this theory and show

that the toxin is distributed through the body by the lymph-vascular systems.—R. E. GLOVER.

LEE, A. M., & SCRIVNER, L. H. (1941). **Experimental Work upon Recent Outbreaks of Abortion in Ewes.**—*Amer. J. vet. Res.* **2.** 50–54.

The morphological and cultural characters of a vibrio causing abortion in three flocks of sheep are described. The organism described by the authors closely resembles *V. foetus* in its characters. It was consistently isolated from the abomasum, blood, liver, and spleen of aborted lambs, sealed cystine-veal-infusion-dextrose-agar slants being used as the culture media. Although the organism showed slow and scanty growth and produced a large amount of a mucin-like substance in the media, the authors succeeded in preparing enough satisfactory antigen to carry out agglutination tests on the sera of seven ewes which had aborted. Titres were fairly high in one or two cases, but low or negative in others and the authors state that the test did not appear to be a practical diagnostic procedure. In a small series of transmission experiments, abortions were produced in a number of pregnant ewes by feeding and the intravenous inoculation of cultures and by feeding naturally infective material. The incubation period appeared to be from 10–20 days or more.

The authors discuss the possible causes of outbreaks of abortion in two flocks in which the vibrio was not isolated.—N. J. SCORGIE.

LINTON, R. W. (1940). **The Chemistry and Serology of the Vibrios.**—*Bact. Rev.* **4.** 261–319.

Investigation of the chemical structure of the vibrio group has shown that there are at least three types of polysaccharides found throughout the group with galactose, arabinose, and glucose as the dominant monosaccharides on hydrolysis. Studies of the protein structure by optical racemization methods show that there are at least two types of protein, and a classification of the group of vibrios had been suggested on the basis of their polysaccharide and protein structure.

The metabolism of the organisms is considered, energy being obtained by fermentation methods for preference, with both carbohydrate and protein as essential nutrients for growth under anaerobic conditions. The organisms have also been classified by their ability to produce acids from various sugars, although it is pointed out that serological methods are more exact than biochemical methods. The constituents of various culture media suitable for growth are discussed. Consideration is given to the importance of haemolytic power, especially since the isolation in 1905 of the El Tor strain, and the vast amount of contradictory evidence on haemolysin production has shown the necessity for exact and delicate adjustment of the conditions under which haemolytic activity can occur.

Careful consideration is devoted to the work on toxin and antitoxin production, antigenic structure, and dissociation in relation to antigenic structure. Studies on dissociation have given results which may prove of value when applied to epidemiology, or it may be found that the variants are merely abnormalities produced in the laboratory.—ALFRED EDEN.

NELSON, J. B. (1940). **Infectious Catarrh of the Albino Rat. I. Experimental Transmission in Relation to the Rôle of *Actinobacillus muris*. II. The Causal Relation of Coccobacilliform Bodies.**—*J. exp. Med.* **72.** 645–654 and 655–662.

I. Between 1934 and 1940, N. had under observation a natural infection of the albino rat, which resulted in a high rate of rhinitis and otitis media. The disease was characterized by loss of weight, snuffling, and haemorrhagic crusting around the nares and eyes. A pure or mixed culture of *A. muris* was recovered from 50–60% of cases. The intranasal instillation of pure cultures was not followed by otitis media, but a few positive results followed when a simultaneous inoculation of *Brucella bronchiseptica* was made. The natural infection could be transmitted to selected animals by nasal instillation of exudate from the nose and ears of affected rats. Serial passage revealed that, after the 12th passage, *A. muris* and *Br. bronchiseptica* which were present originally could not be recovered, but the inoculated rats still continued to be affected with rhinitis and otitis media. N. concludes that because infectious catarrh occurs in its absence, and also because of its non-invasiveness on nasal instillation, *A. muris* is of no direct aetiological significance. The relationship of *A. muris* and *Streptobacillus moniliformis* is discussed.

II. N. records that small Gram-negative rods are probably the aetiological agent of infectious catarrh of albino rats. They are

similar in many respects to the coccobacillary bodies which are thought to cause fowl coryza and mouse catarrh. They could be cultivated in tissue culture but not on solid or fluid media. They were demonstrable in 90% of the exudates from the nasal passages and the middle ear. The characteristic syndrome was reproduced by the nasal instillation of tissue cultures and the experimentally produced disease could be communicated to other rats by direct contact.

The properties of these coccobacillary forms are discussed and a comparison is made with the " pleuro-pneumonia-like " group of organisms. Several dissimilar characters are apparent.—J. S. PATERSON.

TYZZER, E. E. (1941). **The Isolation in Culture of Grahamellae from Various Species of Small Rodents.**—*Proc. nat. Acad. Sci.* **27.** 158–162.

Non-motile coccobacillary organisms, staining faintly with such stains as Löffler's methylene blue but intensely with Giemsa's stain, were isolated from the blood of three species of mouse, the shrew, and the vole in Noguchi's semi-solid leptospira medium, and were demonstrated microscopically within the red blood cells of these rodents. Their cultural characters on blood agar are considered to justify their classification as bacteria rather than as protozoa. —R. O. MUIR.

LOOFBOUROW, J. R., & MORGAN, M. N. (1940). **Investigation of the Production of Growth-promoting and Growth-inhibiting Factors by Ultra-violet Irradiated Microörganisms.**—*J. Bact.* **39.** 437–453.

Suspensions of *Saccharomyces cerevisiae*, *Bacterium aerogenes*, *Bacterium coli*, and *Staphylococcus aureus* were irradiated with lethal doses of ultra-violet radiations and the concentrates of cell-free filtrates from these suspensions and from non-irradiated control suspensions were tested on homologous organisms and on *S. cerevisiae* for growth-promoting effect; the concentrates from *S. cerevisiae* were tested on all the organisms used and on *Diplococcus pneumoniae*. The irradiated yeast preparations stimulated the growth of all organisms to a greater extent than did the control non-irradiated concentrates. The effect of the *Bact. coli* preparations was similar to those from yeast, but assay on the organism itself showed that both the control and irradiation products contain materials inhibiting the growth of *Bact. coli*. In the case of *Bact. aerogenes* and *Staph. aureus* the results indicated that irradiation led to the production of an inhibitory or toxic factor, which was more effective on the homologous organism than on yeast, and to the production of a growth-stimulating factor effective on yeast.—R. ALLCROFT.

I. STREET, H. R., & REEVES, R. E. (1940). **Occurrence of Riboflavin in Tubercle Bacillus.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 641–644.

II. O'KANE, D. J. (1941). **The Synthesis of Riboflavin by Staphylococci.**—*J. Bact.* **41.** 441–446.

I. The fluorescence noted in 25% alcoholic extracts of partly defatted tubercle bacilli was suggestive of riboflavin; this was confirmed spectrophotometrically by conversion to lumiflavin in alkaline solution, irradiation with ultra-violet light, acidifying and extracting with chloroform. Quantitatively the original dried bacteria, grown on Long's synthetic medium, were found to contain 36·6 p.p.m. flavin. The riboflavin nature was further confirmed by biological assay on rats in which growth was promoted to the same extent as with a calculated corresponding quantity of pure crystalline riboflavin.

II. *Staphylococcus aureus*, grown on a flavin-free synthetic medium, synthesized a fluorescent substance which appeared to be riboflavin since it gave the characteristic yellow-green fluorescence of lumiflavin following irradiation in alkaline solution and acidifying and extraction with chloroform, and also stimulated the growth in a special medium (riboflavin-free) of *Lactobacillus helveticus*, which otherwise fails to grow. *Staph. flavus*, when grown in a synthetic medium containing only glucose and inorganic salts, also produced a flavin-like substance, based on the properties of fluorescence and the lactobacillus growth test.—ALFRED EDEN.

PARTRIDGE, S. M., & KLIENEBERGER, E. (1941). **Isolation of Cholesterol from the Oily Droplets Found in Association with the L1 Organism Separated from *Streptobacillus moniliformis*.**—*J. Path. Bact.* **52.** 219–223.

The oily droplets seen in colonies of the L1 organism isolated from *Streptobacillus monili-*

formis were found to consist mainly of free cholesterol. There appears to be good evidence that this cholesterol is derived from the 20% serum broth on which the organisms are grown and is not a synthetic product of the organism itself.—ALFRED EDEN.

DISEASES CAUSED BY PROTOZOAN PARASITES

HOARE, C. A. (1940). **Recent Studies on the Kinetoplast in Relation to Heritable Variation in Trypanosomes.**—*J. R. micr. Soc.* **60.** 26–35.

It is pointed out that as the kinetoplast may be absent in some or all of the individuals of certain strains of trypanosomes, this structure appears not to be essential to the existence of these flagellates. Akinetoplastic strains of trypanosomes may be produced as the result of individual variation. Normal strains of *T. evansi* may show 0–8% of individuals devoid of a kinetoplast, but HOARE & BENNETT [*V. B.* **8.** 19, and **10.** 244.] recorded the detection of five akinetoplastic strains occurring in nature in camels in the Sudan.

When maintained in laboratory animals strains of *T. evansi* may completely lose the kinetoplast and become indistinguishable from *T. equinum*, but one strain isolated from a camel and maintained in rodents showed a variation from 1–71% in the number of akinetoplastic individuals.

Akinetoplastic strains of trypanosomes may also be produced by the action of certain drugs, which may destroy the kinetoplast or possibly inhibit its power of division. Such strains remain akinetoplastic indefinitely.

After analysing genetically the available data, H. concludes that the akinetoplastic condition in trypanosomes can be interpreted either as a mutation depending on changes in the chromosome constitution, or as a phenomenon of cytoplasmic inheritance. It is suggested that the genetic mechanism concerned with the origin and perpetuation of the akinetoplastic condition in trypanosomes requires further investigation.—U. F. RICHARDSON.

*IRR, M. G. (1938). **Generalized Leishmaniasis in Dogs. Clinical Observations on the Formol-Gel Reaction in Diagnosis and Prognosis.**—*Algérie méd.* May. [Abst. from German version in *Berl. Münch. tierärztl. Wschr.* 677–681. Note by translator (W. WITTMER) p. 681].

Observations are recorded on the relationship of the formol-gel reaction to the severity of the attack in canine leishmaniasis, and on the effect of treatment on the reaction. The dogs on which the observations were made could be divided into two groups, the first of which was characterized by a slow gelification of the serum, such animals improving under treatment. In the second group gelification occurred within a few minutes, the animals showed more or less severe symptoms of disease, and failed to respond to treatment.

Treatment consisted in the injection of " stibyal ", which in the early work was given at a total dose of 84 cg. in three series of six injections spread over a period of two months. This treatment was not always tolerated, and later it was reduced to doses of 18–30 cg. in three series of six injections separated from each other by 1–2 weeks. In cases belonging to the first group, treatment resulted in retardation of gelification, and finally in its disappearance. If the test failed to become negative under treatment, relapses might be expected. In the second group of animals, treatment failed to affect the rapidity of gelification, and the animals usually died.

It is concluded that when gelification is delayed a favourable prognosis can be given, but delay cannot be accepted as indicating freedom from infection, and rapidity in gelification may indicate intense parasitism. If gelification occurs in the absence of disease symptoms, the effect of treatment may help in the confirmation of the diagnosis. Animals which recover under treatment are not immune to experimental reinfection, but after one or two attacks they appear to acquire sufficient immunity to protect them in an infected environment.

In his note, the translator describes his treatment of a dog affected with leishmaniasis, which was brought to Hamburg from Algeria. As " stibyal " was not available, W. used neosalvarsan and " neostrontiuran ", but with no effect. Antimosan solution was then tried, and was found to be well tolerated and reasonably effective, with the advantage that it need not be given intravenously.—U. F. RICHARDSON.

MADSEN, D. E. (1941). **Trichomonads in the**

Heart Blood of an Aborted Fetus.—*Cornell Vet.* **31.** 18–20.

M. reports that flagellates, morphologically indistinguishable from *T. foetus*, were observed by microscopic examination of the oral mucosa, stomach contents, heart blood, and lungs of an aborted four-month bovine foetus. No trichomonads could be found in the uterine fluid, although the previous history indicated that the dam was infected with *T. foetus*. M. states that there is no previous report in American literature of the finding of trichomonads in the heart blood of aborted bovine foetuses.

—N. J. Scorgie.

Bruce, K. L. (1941). **Trichomoniasis in a Puppy.**—*Vet. Med.* **36.** 261.

Trichomonads were found in the diarrhoeic faeces of a puppy which showed typical symptoms of distemper. The puppy died despite administration of dog distemper antiserum and sulphanilamide.—M. L. Bingham.

Patino, F. P. (1940). Estudio preliminar sobre la piroplasmosis canina. **[Piroplasmosis in Dogs in Colombia].**—*Rev. Med. vet., Bogotá.* **10.** 484–489.

P. reports on *Babesia canis* infection in Colombia.—Miller Watson.

Huff, C. G. (1941). **Comparisons of a Clon of *Plasmodium cathemerium* with its Parent Strain and with Two Strains Derived from the Clon by Mosquito Transmission.**—*J. infect. Dis.* **68.** 184–187.

This reports the results of studies made upon a " clon " of *P. cathemerium*, its parent strain, and two strains arising from mosquito transmissions of the " clon ". Particular attention was paid to quantitative aspects of the oocyst stage such as size, variability, average numbers per infected mosquito, and infectivity for *Culex pipiens*. Size variation of oocysts was reduced by the production of the " clon " and was not restored by mosquito-passage of the " clon ". No differences in size or average number of oocysts per infected mosquito were produced by single-cell isolation or mosquito passage. One of the strains, which had lost the ability to produce large numbers of gametocytes, regained it after passage through a mosquito.—C. Horton Smith.

Menzani, C. (1939). Il blastocystis e l'eziologia del black-head. **[Blastocystis and the Aetiology of Blackhead].**—*Clin. vet., Milano.* **62.** 12–20.

Literature on the nature and importance of blastocystis is reviewed, and it is pointed out that workers have differed in their opinion as to the nature of these parasites and also as to their pathogenicity. Blastocystis has been classified as a sporozoon, as a flagellate related to the trichomonads, and as a vegetable organism, and it has been considered by some to be pathogenic, whilst others regard it as a secondary invader which may aggravate the disease process. In view of his inability to detect flagellate forms in the liver lesions of blackhead, or in infective faecal material, M. had previously believed that the blastocystis associated with blackhead was the primary cause of the disease, the histomonad being a secondary invader of the inflamed caeca. As a result of more recent observations he now claims that the blastocystis is a degenerate form of *Histomonas meleagridis*, basing this claim on the similarity of appearance of the cytoplasm of the two organisms after exposure to formalin, and on their similar reaction to Giemsa staining. [The grounds for supposing the two parasites to be forms of a single species seem to be quite inadequate.]

—U. F. Richardson.

Tyzzer, E. E. (1941). **" Interference " in Mixed Infections of Bartonella and Eperythrozoon in Mice.**—*Amer. J. Path.* **17.** 141–153.

That one type of human malaria may exclude another has often been observed. Similar, but more clearly cut, examples of this " interference " are reported in this paper in connexion with bartonella and eperythrozoon infections. The bartonella studied was derived from a white-footed mouse, *Peromyscus leucopus novaboracensis*; it was found to be pathogenic to splenectomized normal white mice. An already established *E. coccoides* infection in splenectomized white mice " interfered " with the development and associated symptoms of an introduced bartonella infection. Of considerable importance is the fact that, although the bartonella cannot be demonstrated by microscopic means, it nevertheless remains latent and may, after some time, replace the *E. coccoides* infection which in turn becomes latent. The observations indicate that experimental results may be rendered misleading, or even completely reversed, by the presence of hidden infections. T. also shows that a previous

infection with the bartonella is suppressed by the introduction of *E. coccoides*. The interesting question arises as to whether it may be practicable to render serious infections harmless by vaccinating with harmless parasites.

—C. Horton Smith.

Lotze, J. C., & Yiengst, M. J. (1941). **"Eperythrozoonosis" in Cattle in the United States.**—*N. Amer. Vet.* **22.** 345–346.

In the course of investigations on anaplasmosis, large numbers of bodies apparently identical with *Eperythrozoon wenyoni* were found in the blood of cattle experimentally infected with *Anaplasma marginale*. There is, as yet, no evidence of the occurrence in the U.S.A. of "eperythrozoonosis" unassociated with anaplasmosis.—M. L. Bingham.

Wolfson, F. (1940). **Organism Described as Avian Toxoplasma.**—*Amer. J. Hyg.* Sect. C. **32.** 88–99.

Little is known of the nature and life-cycle of toxoplasms with the result that confusion exists in the literature as to the true identity of these organisms. The present paper reviews the position as it stands at present. W. has observed three distinct types in the tissues of canaries which, according to some published descriptions of *Toxoplasma*, may easily be confused with one another, or may, if found together, appear to be different stages of a single life-cycle. These three organisms, which are described in tabular and diagrammatic form, include one which W. believes to be an exo-erythrocytic stage of the avian *Plasmodium* as all attempts have so far failed to separate the one from the other. The position of the second type is still uncertain, while the third type appears to be similar in morphology and physiology to the mammalian *Toxoplasma*.

—C. Horton Smith.

Fendler, K. (1938). Ueber den Befall der Schweine mit Miescherschen Schläuchen und deren fleischbeschauliche Beurteilung. [**Action at Meat Inspection Regarding Sarcosporidiosis in Swine**].—*Inaug. Diss., Leipzig.* pp. 24.

F. examined for *Sarcocystis miescheriana* the carcasses of 105 pigs from three abattoirs in different parts of Germany. Predilection sites of the cysts were found to be the muscle of the diaphragm, especially the pillars, and the muscles of the abdomen and of the larynx. Of 50 of these pigs examined by Bergmann's method, *i.e.* by the microscopic examination of eight compressorium specimens, 44 (88%) were found to be infected. Of a further 1,852 pigs examined according to the routine meat-inspection method for the detection of trichinosis, *i.e.* by the examination of a single compressorium specimen, only 18·8% were found to be infected. F. concluded that *Sarcocystis* infection is much more widespread than generally appears.

As a means of determining the degree of infection, F. recommended that a portion of muscle the size of an oat grain be examined by means of a special compressorium, one glass being divided into 14 equal fields [the size of which is not given]. F. considers a total count of 56 or more cysts per preparation to be indicative of a moderate infection. No figure could be given for a heavy infection, as none occurred in the course of this survey. No evidence was found of pathogenicity for swine.

—E. S.

Walch-Sorgdrager, B., & Bohlander, H. (1939). Over de verdeeling der leptospira-stammen in groepen door middel van de agglutinatie-lysis reactie. [**Differentiation of Leptospira by the Agglutination-Lysis Reaction**].—*Antonie van Leeuwenhoek, ned. Tijdschr. Hyg. Microbiol.* **5.** 100–111.

Using monovalent rabbit antiserum, the authors examined 300 strains of leptospira and classified them into 12 groups. To differentiate strains coming from abroad it is necessary to test them with the antisera of all the groups; for a strain from Holland two agglutination-lysis reactions suffice, *viz*, tests for *L. canicola* and *L. ictero-haemorrhagiae*.—L. Tobback.

Nørgaard, J., & Petersen, C. B. (1938). Om Leptospirosis canum. [**Canine Leptospirosis**].—*Maanedsskr. Dyrlaeg.* **50.** 81–98, and 127–135. [Abst. from authors' summary].

In Copenhagen it was found that a proportion of the cases of acute nephritis in dogs are due to leptospiral infections. In 18 out of 21 such cases, *L. canicola* was concerned, being isolated from the urine of five dogs and diagnosed serologically in the remaining 13. The type of leptospira in the other three cases was not determined.

The clinical symptoms included nephritis,

high fever, muscular pain, photophobia, and conjunctivitis.

Cylindrical casts and an increase in blood urea were found in some cases in which albuminuria was absent. Spirochaetes were observed, but only for a period of a few days, in the urine of 19 of the dogs. In serological diagnosis, acute infection was indicated by a titre of at least 1 : 1,000.

Treatment with flavines was ineffective. Dilute HCl was given *per os*, to kill leptospira in the urine and so to remove the risk of spreading infection.—J. E.

*Lucrezi, G. (1940). Ricerche sierologiche sulle leptospire dei cani dandagi di Napoli. [**Leptospirosis in Stray Dogs in Naples**].—*Boll. Ist. sieroter. Milano.* 244. [Abst. from abst. in *Boll. Sez. ital. Soc. int. Microbiol.* **12.** 143].

Diagnosis by the detection of serolysins and sero-agglutinins was carried out on 100 dogs, and was positive in 12 cases and doubtful in 20.

Schüffner, W. (1941). Leptospirosis bei zahmen Ratten und der Schutz gegen die Ansteckungsgefahr. [**Leptospirosis in Tame Rats and Protective Inoculation against Danger of Infection**].—*Z. ImmunForsch.* **99.** 323–332.

An account of a case of leptospiral jaundice in an attendant of a laboratory stock of rats. Fifty rats from the lot of which one had bitten the patient and 42 rats taken at random from the rest of the colony were killed and examined microscopically and culturally for leptospiral infection using kidney cortex. Fifteen of the former (30%) and 18 of the latter lot (43%) were found to be infected.

A method was evolved of immunizing the personnel of the laboratory, a serviceable degree of immunity, as indicated by the blood agglutinin titre, being conferred by two intravenous doses of heat-killed leptospira culture, at an interval of seven days. [It is inferred, though not explicitly stated, that a strain of *L. icterohaemorrhagiae* was used.]—J. E.

Larson, C. L. (1941). **Susceptibility of Young Mice** (*Mus musculus*) **to** *Leptospira icterohaemorrhagiae*.—*Publ. Hlth Rep., Wash.* **56.** 1546–1556. [Author's conclusions copied *verbatim*].

1. Young white mice (*Mus musculus*) are extremely susceptible to *L. icterohaemorrhagiae* and develop signs of generalized infection prior to death. The mortality rate approximates 100 percent in 3-week-old mice, but falls rapidly as age increases. 2. Infection may be induced by inoculation of organisms by intraperitoneal, subcutaneous, or oral routes. 3. Three strains of *L. icterohaemorrhagiae* originally isolated from wild rats have been maintained in mice in a fully virulent state for 27, 25, and 6 passages. 4. White mice are suitable animals for laboratory studies of leptospirosis.

DISEASES CAUSED BY VIRUSES

Cohrs, P. (1940). Skelettmuskelveränderungen bei Maul- und Klauenseuche des Rindes. [**Skeletal Muscle Changes in Foot and Mouth Disease**].—*Z. InfektKr. Haustiere.* 57. 37–54.

Reports suggest that as many as 3·6% of adult cattle and 5·5% of calves show skeletal muscle changes following an attack of F. & M. disease. C. bases his classification of the changes which occur on an exhaustive examination of 19 animals. In calves, the condition is a general myositis, seen 3–15 days after the onset of the disease. The muscles of the shoulders, thighs, and upper third of the limbs undergo rapid and acute hyalinization, with swelling of the fibres, loss of pigment, and finally precipitation of calcareous particles.

In adult cattle, the changes in the musculature are focal in distribution. They are found 3–10 weeks after the onset of the disease' especially in the thigh muscles. The condition is not readily diagnosed, but is a likely sequel to a severe attack of F. & M. disease. The lesions found are of four types. (1) Nodules up to 4 in. in diameter, in which there is hyalinization of the fibres resembling that found in the calf. These nodules are surrounded by a congested zone. (2) Necrotic foci arising from (1). Encapsulation proceeds with advancing necrosis, and there is thrombosis of the smaller arterioles and veins, due to swelling of the elastic lamina, and swelling and hyalinization of the media. (3) Areas of haemorrhage, which are probably due to the vascular changes. (4) Softening of the necrotic foci results in the formation of cavities containing as much as a litre or more of fluid sometimes pus-like and grey-brown in colour, and sometimes serous,

containing fibrin and tissue debris. There is a well defined capsule which may show necrosed muscle fibres. The contents of such foci are bacteriologically sterile, and it is suggested that the lesions described arise primarily from circulatory disturbance produced by a direct action of the F. & M. virus on the intima of the blood vessels.—J. B. Brooksby.

Mosconi, R. D., & Gonzalez, C. (1940). Lesiones degenerativas musculares en la fiebre aftosa. **[Muscular Degenerative Lesions in Foot and Mouth Disease]**.—*Rev. Med. vet., B. Aires.* **22.** 214–218.

In their examination of carcasses in the abattoir the authors observed acute myocarditis in young animals which had had F. & M. disease. Similar lesions were also observed in the skeletal muscles which, macroscopically, appeared as longitudinal greyish-yellow striations. Microscopically the lesions were seen to be degenerative with subsequent calcification of muscle fibres. There was abundant inflammatory infiltration of the interstitial tissue.—Miller Watson.

Köbe, K. (1941). Ergebnisse und Probleme zur Klärung des Immunisierungsvorganges nach der aktiven Schutzimpfung gegen Maul- und Klauenseuche. **[The Immunization Process following Active Immunization Against Foot and Mouth Disease]**.—*Dtsch. tierärztl. Wschr.* **49.** 13–16.

K. refers to work carried out in 1931 [*Zbl. Bakt. I.* (*Orig.*). **123.** 285.] in which he claimed to have shown in electrophoretic experiments that the F. & M. disease virus had two components, an infectious component which was negatively charged, and a non-infectious component which was positively charged. The latter component was contained in the fluid at the cathode which although non-infective had the power, when mixed with an equal volume of g. pig vesicular lymph, of making the titre of this mixture 2–16 times as high as that of a similar mixture comprising equal parts of the lymph and phosphate buffer. This "infectivity-raising" component was considered to be type specific in its action and to be absent from the lymph of artificially produced vesicles. In work carried out with Wahl [*V. B.* **11.** 761.], K. claimed to have discovered an identical "infectivity-raising" factor in the serum of g. pigs 5–38 days after inoculation of a vaccine prepared from an aluminium hydroxide adsorbate.

From these findings a hypothesis is evolved to explain the reason for the production of a longstanding active immunity in cattle by the Riems vaccine [see *V. B.* **9.** 17.] which, after strict trials, has not been shown to contain any living virus.

At pH 9·2 the aluminium hydroxide particle is positively charged and attracts the negatively charged infectious component of the virus. By treatment with heat and formalin the infectivity of this combination is destroyed, and when inoculated subcutaneously the aluminium hydroxide retains the adsorbed virus component at the site of inoculation and it plays no prominent part in the production of immunity. The positively charged component of the virus is, however, free to circulate throughout the body (and has been found in the serum of vaccinated g. pigs) and it is this component which acts as a type-specific antigen.—H. H. S.

Krupski, A., & Uehlinger, E. (1941). Beobachtungen an mit Kristallviolett-Vakzine gegen die Blasenseuche geimpften Kühen. **[Observations on the Use of Crystal-Violet Vaccine against *Blasenseuche* (? Foot and Mouth Disease)]**.—*Schweiz. Arch. Tierheilk.* **83.** 125–131.

Of four cattle inoculated with Graub's crystal-violet vaccine [see *V. B.* **11.** 161.], three were completely protected against infection on exposure to contact with severely infected animals one month later.—H. H. S.

Curasson, G. (1940). La peste bovine en Afrique Occidentale française en 1939. **[Rinderpest in French West Africa in 1939]**.—*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 207–212.

C. reviews the position of rinderpest in French West Africa and stresses the importance of immunization.

In Senegal there were a few outbreaks at the end of the year. In Mauritania the disease developed in an enzootic form throughout the year in the areas near the river. In the Sudan there were outbreaks over all the country with 1,040 deaths. In Niger there were numerous outbreaks (50% more than in 1938), causing the death of approximately 44% of the infected animals. There were six outbreaks in three centres in Dahomey, and very numerous outbreaks with a high mortality rate in the Ivory

Coast. Two epizootics caused 7,000 and 6,000 deaths in Guinea. At Dakar practically all the animals were immunized with very satisfactory results.

Immunization is now requested by the breeders, particularly the serum-virus and vaccine-virus methods. A list is given of the various types of vaccination carried out by the veterinary services in each colony. During the year the total number of vaccinations was 78,104 in Senegal, 20,305 in Mauritania, 445,289 in the Sudan, 201,307 in Niger, 43,257 in Dahomey, 28,672 in the Ivory Coast, 14,370 in Guinea, and 3,080 at Dakar.—L. T.

TARANTINO, G. B. (1939). Impiego del vaccino formolato nella profilassi contro la peste bovina. Suoi riflessi sulla organizzazione del servizio veterinario coloniale. **[Formolized Vaccine in Rinderpest]**.—*Azione vet.* **8.** 245–247.

Formolized spleen vaccine has been used in southern Abyssinia because insufficient serum has been available to deal with rinderpest outbreaks in government herds. It is pointed out that the use of such a vaccine has two advantages over serum-virus inoculation, *viz*, the vaccine can be prepared in the field and its use does not create infective animals. It is thought that the immunity conferred by vaccine lasts for at least three months, and it is suggested that it would form the ideal method of protection if the veterinary staff were sufficient to carry out inoculations of government herds twice yearly.

It is pointed out that the area has a high cattle population, but the natives will not sell their cattle, as owing to the epizootics they dare not part with excess stock, and it is recommended that the disease should be eradicated centre by centre, by serum-virus inoculation of infected herds and vaccination of surrounding stock. It is considered that reintroduction of rinderpest could be prevented by immunization of frontier herds, in which calves would be inoculated annually, and by the vaccination of an inner ring of cattle to prevent the spread of infection from the border herds to the interior.

—U. F. RICHARDSON.

PHILIPPE, J. (1940). Utilisation pratique du vaccin sec contre la peste bovine. **[Use of a Dry Vaccine against Rinderpest]**.—*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 93–99.

Since the pulp remaining after preparation of organ filtrates still possesses immunizing properties, P. used it to prepare a dry vaccine. The pulp was dried at approximately 45°C., then ground and finely sifted; it was stored in a refrigerator. 1 g. of this powder added to 20 c.c. of water forms a rather unstable suspension which can be improved by addition of glycerin or oil, the latter being the more convenient. The spleen was found to produce the largest quantity of dry pulp. The vaccine was tested on calves and bullocks, and the minimal immunizing dose was fixed at 0·50 g. per 100 kg. body weight. 75–80 doses of liquid formol vaccine and 100 doses of dry vaccine can be prepared from one calf; the use of dry vaccine therefore increases the number of available doses by 125%. The fact that dry vaccine may be preserved more easily than liquid vaccine permits its use on a large scale in the export stations for cattle, where it would be very difficult to produce the required quantity of liquid vaccine.—L. TOBBACK.

I. MALBRANT. (1940). Emploi du vaccin formolé glycériné contre la peste bovine. **[Use of a Formol-Glycerin Vaccine against Rinderpest]**.—*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 111–112.

II. LALANNE, A. (1940). Sero-vaccination et vaccination antipestiques en Moyenne Côte d'Ivoire. Durée de l'immunité. **[Serum-Vaccine Immunization and Vaccination against Rinderpest in the Centre of the Ivory Coast. Duration of Immunity]**.—*Ibid.* 167–174.

I. Formol-glycerin rinderpest vaccine may be used in smaller doses than ordinary formol vaccine. A solid immunity is conferred on oxen of 80–120 kg. body weight by a dose of 12–15 c.c., whereas the dose required of ordinary formol vaccine is 20–25 c.c. Approximately 100 doses of ordinary formol vaccine can be prepared from the serum of one ox. If glycerin is added to the vaccine the number of doses rises to 133, and if dry vaccine is prepared from the residual pulp, 120 supplementary doses can be obtained.

II. L. investigated the duration of the immunity after serum-vaccine inoculation or vaccine alone. The vaccine was prepared as prescribed by the Bamako laboratory. Eight calves injected with 40 c.c. of serum and 30 c.c. of vaccine, or with 30 c.c. of vaccine alone were exposed one or two months later to natural infection and were inoculated with virulent blood (5 c.c.).

Immunity resulting from combined serum and vaccine lasted only for a month, and that conferred by vaccine alone lasted two months.

The following control measures are recommended :- (1) Inoculation of apparently healthy animals in affected herds with serum and virus, and of the infected animals with serum alone ; (2) Inoculation with serum and virus of animals in herds threatened with infection, and (3) immunization with formol vaccine in all other herds.—L. Tobback.

Philippe, J., & Sissoko, M. (1940). Essai d'immunisation contre la peripneumonie. (Troisième note). Importance de la methode d'épreuve. **[Immunization against Bovine Contagious Pleuro-Pneumonia. III. Importance of the Method of Testing]**.—*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 100–106. [For previous parts, see *V. B.* **11.** 363].

The authors refer to previous immunization trials against bovine contagious pleuro-pneumonia with lung exudate in an oily excipient. They now report further experiments with larger doses of vaccine (1–5 c.c.) rendered avirulent by 48–72 hours' incubation at 37°C. The oily excipient used was lanolin plus liquid paraffin. The method of testing for immunity was also modified. As severe reactions follow subcutaneous inoculation of the test dose and no lesions are produced by intravenous inoculation, the authors developed an easily controlled immunity test of moderate virulence, *viz*, intravenous inoculation of thoracic exudate incorporated at 45°C. in agar, the mixture being solidified by a current of cold water into so-called " virulent emboli ". The technique and the necessary precautions are described.

Results of the vaccination trials with the exudate are given. Sixteen calves were vaccinated by a mixture of virulent exudate 1 part, lanoline 3 parts and liquid paraffin 6 parts. Some of the animals were tested for immunity subcutaneously and the others by " virulent emboli ". The immunity conferred was insufficient to protect against subcutaneous infection but was sufficient against the " virulent emboli " test.

Further experiments will be carried out on the duration of this immunity.—L. Tobback.

Schofield, F. W., & Potter, H. R. (1939). **A Report on the Investigation into Suspected Outbreaks of Encephalomyelitis during the Summer and Fall Months of 1938.**—*Rep. Ont. vet. Coll. 1938.* pp. 16–25.

The result of investigations on suspected cases of E.E. in the province of Ontario between July and October 1938 are given. Twenty-seven cases were diagnosed, half of which occurred in Niagara township. They were on 24 farms and the source of infection could not be traced. All these cases fell within two main categories, maniacal or lethargic. Some showed a combination of these symptoms or passed from one type to the other. High initial temperatures were general. Hyperaesthesia was constant, especially in the skin of the head. Loss of appetite, difficulty in swallowing, paralysis of the lips, facial paralysis, and muscular twitchings were seen in most cases. An early symptom was incoordination of movement. The urine was sometimes dark in colour. Jaundice was always present. Death usually occurred in from 18 hours up to 4–5 days. Although the type of virus was not identified, it was suggested to be the Western type, as horses from the Canadian west had been imported ; a Western type vaccine was therefore used.

Cases which closely resembled the so-called " X " disease described by Marsh [*V. B.* **8.** 572.] occurred during the epizootic. The condition was sudden in onset and there was no rise in temperature ; the definite loss of co-ordination of movements was accompanied by restlessness and a great desire to keep on the move. There was severe jaundice, enteritis, and in some cases peritonitis. The severe hepatic degeneration may be the result of the enteritis and toxaemia which occur. Animal inoculation tests were negative. Bilirubin estimated by the van den Bergh test showed 2·6 and 5·0 van den Bergh units in two slightly jaundiced horses while the diseased horse, with which they were in contact, showed 17·0 units and a control horse 0·6 units. There was damage to the liver in both E.E. and " X " disease. Samples of blood taken several weeks after recovery might in either disease show a high bile content.—J. A. Griffiths.

Schofield, F. W., & Labzoffsky, N. (1939.) **Report on Cases of Suspected Encephalomyelitis Occurring in the Vicinity of St. George.**—*Rep. Ont. vet. Coll. 1938.* pp. 25–29.

There were 12 cases with two deaths. The

virus isolated gave evidence of being closely related to, or identical with, the Eastern virus. —J. A. GRIFFITHS.

FINKELSTEIN, H., MARX, W., BEARD, D., & BEARD, J. W. (1940). **pH Stability of the Virus of Equine Encephalomyelitis (Eastern Strain) Under Various Conditions.**—*J. Infect. Dis.* **66.** 117–126.

The production of the virus in chick-embryo culture, its partial purification using the ultracentrifuge, and the technique of infectivity tests are described.

The purified virus was most stable between pH 7 and 10. From pH 7 to 2 inactivation was relatively slow, but below pH 2 and above pH 10 rapid inactivation occurred. Normal and infected chick-embryo extracts appear to contain a factor which causes marked inactivation of the virus around pH 5·5. A similar factor was found in g. pig and mouse brain, the most rapid inactivation for these extracts occurring at pH 4·8.

The nature and mode of action of the factor were not determined, but it was non-dialysable and was inactivated by boiling.—R. A. K.

OLITSKY, P. K. (1940). **Further Studies of the Agent in Intestines of Normal Mice which Induces Encephalomyelitis.**—*Proc. Soc. exp. Biol., N.Y.* **43.** 296–300.

O. describes certain additional characteristics of the active agent which is present in the intestines of normal mice and which can induce encephalomyelitis indistinguishable from the spontaneous disease described by M. THEILER [*V. B.* **7.** 602, and **11.** 449]. The agent is absent from the central nervous system of normal mice. It is not detectable in the intestines of normal baby mice up to the age of 12 days, irrespective of whether the mothers harbour the agent in the C.N.S. as the result of inoculation or naturally in the intestines. Every mouse older than 30 days yielded active agent, but old mice, for some reason not yet understood, harboured less agent than young adults.—J. S. PATERSON.

MARCATO, A. (1939). Contributo anatomo-istopatologico alla conoscenza della peste equina (Eritrea). [**Pathology of African Horse Sickness in Eritrea**].—*Nuova Vet.* **17.** 45–53.

M. describes the morbid anatomy of natural and experimental cases of the disease. In contradiction to previous workers, he has failed to find evidence of inclusions in the liver, kidney, or brain. There is amyloid degeneration of the muscle coat of the intestine and sometimes of the stomach. Proliferation of epithelioid cells is found in the mesenteric lymph nodes, and in the lymph nodes in general there occur numerous cells of the granulocyte series, and erythroblasts.—J. B. BROOKSBY.

DOBBERSTEIN, J., & HEMMERT-HALSWICK, G. (1940). Die Verbreitung der infektiösen Anämie nach geographischen und geologischen Gesichtspunkten. [**The Incidence of Equine Infectious Anaemia from Geographic and Geological Viewpoints**].—*Z. InfektKr. Haustiere.* **57.** 55–74.

E.I.A. was spread widely throughout Europe and even further afield by the movement of horses after the war of 1914–18, but it is now an enzootic limited to fairly well defined areas. The authors have compiled maps showing the distribution of these areas in Germany, north-eastern France, Sweden, Japan, and the U.S.A. In Italy the disease is found in a few regions in the north. It was introduced into South Africa after the Anglo-Boer war, but has since died out.

Search for a factor common to the regions affected has hitherto proved fruitless. E.I.A. has been found in areas in which almost all geological formations are represented, and where the surface soil varies from clay to sand. Perhaps the only significant fact is that the disease is most commonly found along river valleys, but no explanation can be found for its occurrence in some stretches of such valleys and not in others. The authors consider that the distribution of insect vectors is not responsible, as no correlation is found between their occurrence and the outbreaks of the disease. —J. B. BROOKSBY.

ISHII, S., NOBUTO, K., & TANAKA, K. (1940). **On the Histo-Pathological Studies of Infectious Anemia in Horses. V. The Detection of Siderocytes in the Blood of the Jugular Vein and its Clinical Diagnostic Value.**—*Jap. J. vet. Sci.* **2.** 531–557. [In Japanese: abst. from English summary]. [For previous parts, see *V. B.* **10.** 421].

The authors have previously reported siderocytes in the portal and hepatic veins, anterior and posterior vena cava, and pulmonary

arteries, together with haemosiderosis in certain organs in cases of E.I.A. They now describe an investigation into the diagnostic value of siderocytes in the blood of the jugular vein. Citrated blood was spun in a tube fitted with a rubber stopper at its base so that the layer of white blood corpuscles became adherent to the upper surface of the stopper. The supernatant was decanted, the stopper carefully removed and a smear prepared from the w.b.c. layer on the stopper. The smears were stained and examined; siderocytes were found in 60·4% of 225 blood samples taken from horses in various stages of the disease. Positive findings varied, being about 100% in febrile cases or within four days of the febrile reaction, and 40% in cases between the 31st and 100th day after the febrile attack; some cases were positive up to the 300th day. No siderocytes were found in 77 healthy horses, but they were present in three out of 14 cases of strangles and in two out of five cases of petechial fever.

In cases of chronic E.I.A., no siderocytes were normally found in the jugular veins, but after inhalation of amyl nitrite by such cases they were present, possibly because of their dislodgement from the pulmonary capillaries.

—C. V. Watkins.

Suhaci, I., & Popa, M. (1939). Asupra sensibilizării unei tulpini românesti de virus variolic. **[Sensitization of a Rumanian Strain of Sheep-Pox Virus]**. —*Arhiva vet.* **31.** No. 4–5. 22–34. [French and German summaries].

Using a strain of virus isolated in 1931 which could not be sensitized in its original state when placed in contact with homologous immune serum, the authors found that after 80 passages through sheep it could be sensitized satisfactorily. During passage the virulence gradually increased and then diminished very rapidly. This sensitized " Bucarest " strain was used for vaccination of lambs and adult sheep with an average of 90% positive reactions. The vaccine proved satisfactory both with native and imported pedigree breeds of sheep, although the reaction was more marked in the latter. The vaccine does not produce systemic changes and the vaccinated animals do not become carriers, so that it may safely be used in " clean " areas.—Miller Watson.

Schönborn. (1940). Die Schweinepest im Regierungsbezirk Minden. **[Swine Fever in the Minden District]**.—*Berl. Münch. tierärztl. Wschr.* April 19th. 181–185.

S. discusses in some detail the local characteristics of the widespread outbreak of S.F. which began in the winter of 1938 in Germany and continued during the following year. He draws attention to the apparently unusual ease with which it was spread, particularly by human agency, and to its unusual characters including a marked tendency to paraplegia even in the early stages. Control seemed to be best achieved by slaughter, immunization with serum alone or by the simultaneous method often giving poor results. S. believes that the great drawback of the simultaneous method is the production of carriers. For details of the characters of the outbreak the original should be consulted.—A. W. Stableforth.

Calderisi, M. (1939). Peste suina e complicanze negli allevamenti del gargango e la siero-protein vaccin profilassi e terapia secondo il metodo del Prof. Lanfranchi. **[Swine Fever and Lanfranchi's Immunization Method]**.—*Nuova Vet.* **17.** 288–292.

C. reports 97% protection in a controlled field trial of what is spoken of as Lanfranchi's serum-protein-vaccine immunizing agent. The method is stated to depend on a non-specific protein effect against the virus, together with a vaccine against the secondary invaders, but no details are given. Some therapeutic value is also claimed.—J. B. Brooksby.

I. Froim, S. (1937). La maladie des porchers. **[Swineherds' Disease]**.—*Thesis, Paris.* pp. 46.

II. Gsell, O. (1937). Differenzierung der serösen Meningitis. **[Differentiation of Serous Meningitis]**.—*Helv. med. Acta.* **4.** 857–863. [In German].

III. Verge, J., & Leclainche, X. (1937). Maladie des porchers. Grippe des porcelets et grippe humaine. **[Swineherds' Disease. Swine Influenza and Human Influenza]**.—*Paris méd.* **27.** 187–189.

IV. Georgi, F., Pache, H., & Urech, E. (1938). La maladie des porchers. Rechutes, récidives, étiologie. **[Swineherds' Disease. Recurrence, Relapses and Aetiology]**.—*Helv. med. Acta.* **5.** 299–316. [In French].

V. Hadorn, W. (1938). Beiträge zur Kenntnis der Maladie des jeunes porchers. [**A Contribution to the Study of Swineherds' Disease**].—*Schweiz. med. Wschr.* **68.** 375–378.

VI. Ledoux. (1938). La maladie des porchers en Franche-Comté. Inconstance de la méningite. [**Swineherds' Disease in Franche-Comté. Variation in the Occurrence of Meningitis**].—*Bull. Acad. Méd. Paris.* **120.** 417–420.

VII. Urech, E., & Pache, H. L. (1938). Maladie des jeunes porchers et grippe humaine. [**Swineherds' Disease and Human Influenza**].—*Rev. méd. Suisse rom.* **58.** 847–853.

VIII. Campanacci, D. (1939). Eine auf den Menschen übertragbare Krankheit der Schweine. [**A Disease of Swine Transmissible to Man. Swineherds' Disease**].—*Med. Klinik.* **35.** 370–372.

IX. Ledoux, E. (1939). La maladie des porchers. [**Swineherds' Disease**].—*Rev. Hyg. Méd. prév.* **61.** 252–262.

X. Albrecht, B. (1940). Meningitis infectiosa suis. [**Porcine Infectious Meningitis (Swineherds' Disease in Pigs)**].—*Z. InfektKr. Haustiere.* **56.** 190–198. [Shorter version appeared in **Dtsch. tierärztl. Wschr.* 306–307. (1940)].

[See also *V. B.* **9.** 771].

I. F. has not seen cases of swineherds' disease [S.D.] and speaks of communications received as part of the source of the material used in the preparation of the thesis. He discusses the possibility that S.D. may be a type of exanthematic typhus; Weil-Felix reactions carried out have been negative. He does not consider that it is a type of acute lymphocytic meningitis.

II. A brief summary of the nature of acute lymphocytic meningitis. S.D. is included as a condition of this type. A case of S.D. that occurred in eastern Switzerland is described. Shortly before the patient became affected some of the pigs with which he was associated were ill; they were stiff and unable to rise and had to be destroyed. This pig affection is known locally as *Bärhemmig*.

III. The authors state that there are many analogies between S.D., piglet influenza, and influenza in man. They discuss the general manifestations of these diseases. No experimental evidence is provided.

IV. The authors consider that S.D. immunizes the patient. Recurrence is not common but it is known, and instances of relapse and of recurrence are cited. Infection of human beings by human beings has never been observed; the infection appears always to be derived from pigs and the excreta are considered to be the main source. The evidence is against the operation of an intermediate host. Cases occur in winter and this excludes mosquito transmission. There is no history of rat-bite among the patients, and if a winged insect operated the disease would attack a wider range of persons. Cases have occurred in piggeries free from *Haematopinus suis*. Attempts to transmit the disease with the louse have yielded negative results.

The authors state that Durand *et al.* [*V. B.* **9.** 772.] used material from one case, and that an atypical one, when they carried out their experiments. They describe inoculation experiments they carried out themselves with material from human patients, labelled strains A, B, and C. The number of experiments carried out was small. Rabbits are said to have developed temperature reactions but to have shown no other signs of illness. Human beings inoculated with this material showed temperature reactions and failed to react to a second dose six weeks later. Blood taken from human beings on the 3rd–5th day of illness was infective, but the blood was not infective when taken at the end of the febrile reaction.

[The authors give a bibliography which contains several errors. In certain cases the references given do not occur in the publication stated.]

V. H. emphasizes that the incidence of S.D. is not limited to the Upper Savoy. He describes cases of the disease in persons engaged in the butcher trade.

VI. L. considers that formerly cases must have passed unrecognized. He and his colleagues had seen a dozen cases in human beings in Franche-Comté, chiefly in the high plateau of the department of Doubs. Epidemiologically the cases resembled those described by Penso [*V. B.* **7.** 219]. The persons attacked were swineherds of large cheese piggeries and not countrymen with one or two pigs, or dairymen or cheese workers. No cases had occurred among students at the school of dairying at Mamirolle (Doubs) which has a big

piggery. L.'s cases acquired infection from affected pigs. The patients referred to the pig cases as *malade du foie* or *ne tenant pas debout*.

L. refers to the observation by URECH and others [see IV] of reinfections. He had not himself seen relapses or reinfections.

Most of the article is concerned with a discussion of the syndrome in the human cases.

VII. The authors discuss briefly the possibility that there is a relationship between S.D. and human influenza and make comparisons of the syndromes in human cases. They refer to the pig disease, but make no new observations.

They discuss reactions produced in rabbits by infective material from these two diseases and describe some small-scale cross-immunity experiments with rabbits. In these experiments, rabbits injected with serum from a convalescent human case of S.D. did not react to infection with human influenza material; rabbits injected with serum from a convalescent influenza case reacted to S.D.; rabbits injected with serum from one convalescent case of S.D. reacted to infection with S.D., but convalescent serum from another S.D. case did protect against S.D. Rabbits recovered from the reaction to S.D. withstood infection with S.D. 1–7 weeks later.

No comment is made on the results obtained.

VIII. C. has seen cases in Italy in the provinces of Parma, Mantua, Reggio, Modena, and Florence. The disease in man is not contagious; it occurs mostly in the warm season. There was generally a history that the patient had cared for sick pigs, but proof that infection came from pigs was lacking. C. raises the question whether, if pigs are the source of the human disease, healthy or diseased pigs are responsible.

He describes a disease that occurs in pigs in cheese piggeries. There is fever, indigestion, and salivation, followed by excitement, muscular twitching, stiffness of the neck, and movement in circles. Often on approaching the trough to feed they have a fit, falling on their backs with their legs in the air. Recovery usually occurs within 14 days. Often the illness is of a more chronic type, accompanied by severe illness and evidence of meningitis.

C. states that although this disease is not known to veterinarians, it is well known to pig-keepers and spoken of as *balordon* in the dialect of Parma province while in Reggio, Emilia Department, it is known as *mal mazuch*. In Savoy it is called *maladie de tourniquet*.

IX. L. cites the account by GEORGI *et al.* [IV] of infection in a plumber who had done repairs in a piggery and also of a carpenter infected in similar circumstances, and of a pork butcher presumed to have become infected through a skin wound, the last being the only case of abattoir infection reported.

X. A discussion based on the literature on the subject of the nature of the disease in pigs which is considered to be associated with the infection of human beings. No new evidence is produced.—W. A. P.

GALLO, P., & ITURBE, J. (1939). Primeros estudios sobre la rabia paralítica del ganado en Venezuela. **[Studies on Paralytic Rabies in Venezuela].**—*Rev. Med. vet. Parasit., Caracas.* **1**. 91–166. [English summary].

The history of paralytic rabies in Venezuela and the symptoms of the disease are described. From experimental work the authors found that the virus is infective at a dilution of 1 : 5,000, passes through Berkefeld V and all Seitz filters and is preserved by freezing and drying etc.

The disease was transmitted experimentally to cattle, horses, sheep, swine, dogs, cats, birds, and laboratory animals by intracranial, intraocular, and intravenous inoculation, but not by intraperitoneal inoculation. Material from the cerebrum, medulla, salivary glands, lachrymal glands, and saliva was infective whether filtered or not. Bile, faeces, urine, abomasal contents, parenchymatous organs, and lymph nodes were not infective. Street virus injected intracranially set up infection after an incubation period of 17–29 days. Material from the cerebrums of unborn calves of infected mothers proved infective. Infection was not set up by feeding infective organ material or milk from infected animals. The virus became more virulent after passage.

The authors agree that the disease is transmitted by blood-lapping bats which can carry the virus in the blood without showing symptoms of disease. The bats infect each other by biting; they can live for several days without feeding and fly very fast for considerable distances. Non-blood-lapping bats, infected naturally or experimentally, may become carriers of the virus.

Cross-immunity tests indicate that the virus

is identical with typical rabies virus. There does not appear to be any cross-immunity with the virus of equine encephalomyelitis of Venezuela.

The authors managed with difficulty to cultivate the virus on chick embryos, only one experiment in 24 being successful. Embryonic membranes are infective to laboratory animals after three days' incubation. After 7–9 days of growth specific bodies can be seen macroscopically on the membranes; they are between those of psittacosis and laryngotracheitis in size. There are also eosinophile granulations. The incubation period of the disease produced by chick-embryo virus is inconstant. Serial passage of virus in chick embryos becomes difficult, since many embryos do not become infected.

The authors were unable to obtain evidence that ticks are concerned in the transmission of the disease.

They vaccinated 4,000 cattle with phenolized vaccine (street virus), prepared from the cerebrums of naturally infected animals, using Puntoni's technique, but with a higher concentration of virus in order to reduce the number of inoculations from 15 to five. The results were hopeful, the immunity produced being proportional to the amount of material injected and never lasting less than eight months. Experiments were also made with phenolized vaccines from chick-embryo virus, but the results were not conclusive. 500 animals also were vaccinated with dried, live virus, suspended in normal saline immediately before use. One injection was given subcutaneously and produced considerable local reaction as well as slight general reaction. In a small amount of work done the method appeared harmless and the duration of immunity considerable.

Among the prophylactic measures suggested by the authors are:– education of the public regarding the danger of bats; study of the localities where bats are found; destruction of bats (blood-lapping and others), destruction of their nests together with other methods of reducing their numbers, destruction of animals affected with paralytic rabies; protection of animals against bats by providing shelters, illumination at night, and by the folding of animals as close as possible to the farmstead; preventive vaccination, and control of animal transport.—MILLER WATSON.

WEBSTER, L. T., & CASALS, J. (1940). **An Irradiated Non-Virulent Antirabies Vaccine.**—*Science.* **92.** 610–611.

This article summarizes the attempts of several workers at the Rockefeller Institute for Medical Research to improve antirabies vaccine for animal prophylaxis and for treatment of human beings [see also *V. B.* **11.** 690]. Commercial phenolized vaccines have been found to be ineffective; commercial chloroformized vaccines were only effective at 2–5 times the recommended dose and tissue-culture virus has been found to be too low in virus content for vaccine preparation purposes. Infected brain tissue from mice or one-month-old dogs gave the most potent virus; the titre in M.L.D. per c.c. was 33×10^7 for mice, 3×10^6 for g. pigs, and 33×10^3 for rabbits.

A 1% emulsion of such brain tissue was centrifuged at 500 r.p.m. for 5 min. The supernatant (titre 33×10^3 mouse M.L.D.) was rendered avirulent by 20 min. exposure to ultra-violet light. It was found that 0·5 c.c. and 0·1 c.c. of this vaccine protected mice against at least 64 M.L.D. and that 0·01 c.c. protected against 4 M.L.D. Dogs, 300 times as heavy as the mice, given 30 c.c. of the vaccine by intraperitoneal injection, as one dose or as three doses of 10 c.c. at weekly intervals (eight dogs by each method), were all protected when tested four weeks later by intramuscular injection of street virus. Only four out of six dogs were protected by chloroform vaccine and all eight control dogs died from the test dose. The total mortality among all vaccinated and unvaccinated dogs following test injections of rabies virus was 115 of 136 unvaccinated, 45 of 62 treated with 5 c.c. of commercial phenolized vaccine, 22 of 44 treated with 5 c.c. of chloroform vaccine, 25 of 32 treated with less than 20 c.c., 2 of 10 treated with 20 c.c., and only one of 35 treated with 30 c.c. (1 case received 40 c.c.) of 1% irradiated vaccine. The latter remained effective after nine months' storage at 40°F.—C. V. WATKINS.

DAWSON, J. R., Jr. (1941). **A Study of Chick-Embryo-Adapted Rabies Virus.**—*Amer. J. Path.* **17.** 177–187.

Attempts to adapt rabies virus to the chorio-allantoic membrane of the chick embryo were unsuccessful, but three strains were established by the direct inoculation of the chick-embryo brain, using as inoculum material passed intracerebrally through day-old chicks. The

majority of the embryos died 6–8 days later, but a few survived for 13–14 days, *i.e.*, 5–6 days beyond the expected hatching period. After establishment in the egg all the strains produced severe hydrocephalus with symmetrical necrosis. Very numerous Negri bodies were seen throughout the central nervous system.

Between the 17th and 22nd generations in eggs the pathogenicity became debased for rabbits and mice to a degree sufficient to produce a self-limiting, non-fatal disease; on the other hand, material from the 42nd passage was fully virulent for the dog. The possibility of obtaining an attenuated strain suitable for vaccine is discussed.—R. E. Glover.

Jordan, J. H., Pedersen, H., & Shu, S. (1939). **Bites of Rabid Animals Treated by Experimental Cautery with Ultra Violet Rays and Eosin.**—*Trans. R. Soc. trop. Med. Hyg.* **38.** 233–240.

A description is given of a series of experiments carried out on 40 rabbits which were inoculated into the mucous layer of the tongue with a fixed rabies virus. 0·2 c.c. of 2% eosin was afterwards injected into the site of inoculation, which was then immediately subjected to the action of ultra-violet light for varying lengths of time. Owing to factors beyond the control of the authors, the experiments are rather incomplete, but it is considered that, in view of the urgent need for efficient and painless cautery in rabies, the results suggest that further work on the question might well be undertaken.—J. R. Lawson.

Horack, H. M. (1939). **Allergy as a Factor in the Development of Reactions to Anti-rabic Treatment.**—*Amer. J. med. Sci.* **197.** 672–682.

Sixteen persons who showed severe reactions during antirabic treatment were compared with a control series of 45 who had been injected without complications. It was found that in 80% of the former there was a history of allergic disease, while in the latter the proportion was only 30%. It is suggested that if injections of rabies vaccine induce an unusual reaction, a course of desensitization should be instituted.—R. E. Glover.

Habel, K. (1941). **Tissue Factors in Anti-rabies Immunity of Experimental Animals.**—*Publ. Hlth Rep., Wash.* **56.** 692–702. [Author's summary copied *verbatim*].

In normal mice and guinea pigs peripherally introduced street virus remained viable in the muscle for at least 4 days and invaded the nervous system within 24 to 48 hours.

In vaccinated mice and in guinea pigs being vaccinated the peripherally introduced street virus remained viable in the muscle but did not invade the nervous system.

In mice receiving a vaccine of low potency the spread of peripherally introduced street virus appeared to be increased.

There was no definite relationship between the development of serum neutralizing antibodies and immunity to actual infection.

Doerr, R. (1939). Das Problem der Viruswanderung im peripheren und zentralen Nervensystem. **[Spread of Virus in the Peripheral and Central Nervous Systems].** —*IV Congr. int. Pat. comp., 1939.* **2.** 81–95.

The early theory regarding the spread of the rabies virus *via* the nervous system—later applied to other nervous infections of virus origin—and the similar theory regarding the spread of the non-viable tetanus toxin, are reconsidered in the light of more recent research on the permeability of the blood-brain barrier and on local tetany. These recent findings are discussed in detail and cannot be further condensed in an abstract, but there is ample evidence to show that the exact mechanism by which some of the neurotropic viruses spread from a perihepheral site to the central nervous system has yet to be elucidated. —H. H. Skinner.

Blakemore, F., & Gledhill, A. W. (1941). **Some Observations on an Outbreak of Swine Influenza in England.**—*Vet. Rec.* **53.** 227–230.

The occurrence of swine influenza in pigs 10–14 weeks old was reported in the U.S.A. in 1922, and later it was shown that the disease was caused by a filtrable virus in association with a variety of *Haemophilus influenzae* [see *V. B.* **2.** 84]. A condition which affects young piglets, and which similarly has been attributed to a filtrable virus and *H. influenzae*, is prevalent in Central Europe, but its relationship to the American disease has not been established [see *V. B.* **3.** 471]. Lamont (1938) has described the occurrence of an influenzal condition associated with *Haemophilus* infection in pigs 2–6 weeks old in Northern Ireland and in

Scotland. Although infectious pneumonia of pigs has been recognized in England for some years, there has not been any detailed investigation of its aetiology prior to the work reported in the present paper.

An outbreak of disease appeared on a pig farm in East Anglia during the severe weather of March, 1940. The housing conditions were bad. Only animals 6–12 weeks of age were affected. Sneezing was the most characteristic feature, and was the only symptom noted in milder cases. Of a group of 60 affected pigs, however, 20 became seriously ill, with pneumonia, prostration, and, in a few cases, delirium. The course of the disease was usually, but not invariably, short, and mortality was low. P.M. examination of six animals killed at different stages of the disease indicated early catarrhal changes in the nasal cavities without pulmonary involvement and subsequent lobular pneumonia of varying degree. Enlargement of the spleen appeared to be a constant feature. Gram-negative organisms subsequently identified as belonging to the *Haemophilus* group were isolated from three of the six cases, and as both X and V factors were found to be required for growth, they were concluded to be strains of *H. influenzae*.

Young pigs were artificially infected by nasal instillation of a saline mush of the lungs, turbinates, and thoracic lymph nodes of a field case. The disease could be reproduced without difficulty and was passaged through five pigs without any marked rise in virulence. *H. influenzae* was recovered from cases so infected. The disease was transmitted to ferrets, which had been lightly anaesthetized with ether, by nasal instillation of material from a severe experimental case. The disease was passaged ten times, with a considerable variation in lesions, but *H. influenzae* was not recovered from any of the ferret cases. Material from ferrets infected after several passages was still infective for pigs, and neutralization tests with serum from a natural case and the demonstration of neutralizing antibodies in the convalescent pig serum to ferret-adapted virus confirmed the identity of the field disease with that which was being reproduced experimentally. The persistence of virus in the lungs of the pig was indicated by a ferret's being infected with material from the lungs of a chronic porcine case which had been affected eight weeks previously.

It is indicated that further studies are in progress, and that there is reason to believe that an infectious pneumonia of virus origin is widespread in this country.—A. N. Worden.

Scott, J. P. (1941). **Swine Influenza Associated with Hog Cholera.**—*Vet. Ext. Quart. Univ. Pa.* No. 82. pp. 3–12.

During 1938–39 outbreaks of swine fever were discovered which were associated with swine influenza: in addition, atelectatic lesions were noted in pigs used for the production of S.F. virus. Swine influenza virus was isolated either by mouse passage or by transference to the developing chick embryo; it was also recovered by the egg method from phenolized S.F. blood and from five out of 79 samples of S.F. virus. The nature of the virus was confirmed by neutralization experiments in the egg.

The subcutaneous injection of swine influenza virus to pigs affected with S.F. seemed to favour the establishment of the former virus in the lungs. The course of the double infection was often rapid and very severe; it was also characterized by a high temperature within 24 hours and death in 5–9 days. An immunity induced against one of these viruses was not broken down by the injection of a mixture of swine influenza and S.F. viruses; on the other hand, pigs which were only partially immune to S.F. showed typical lesions of this disease when injected with a mixture of the two viruses.

Six batches of S.F. serum completely neutralized swine influenza virus, suggesting that the latter disease may exist in establishments where these sera are produced.

—R. E. Glover.

Jiřina, K. (1939). Vliv Mackovy vakciny proti chřipce koní při horečnatých onemocněních horních cest dýchacích u koní. [**Value of Macek's Influenza Vaccine against Diseases of the Upper Respiratory Tract of Horses**].—*Zvěrolék. Obz.* **32.** 239–242. [Abst. from German summary].

Mareš, J. (1939). Chřipka koní, výsledky s vaccinací podle prof. Dra. Macka. [**Trials with Macek's Equine Influenza Vaccine**].—*Ibid.* 306–310. [Abst. from German summary].

Mazel, F. (1939). Zkušenosti s vakcinou prof. Dr. Macka při chřipce skotu.

[Trials with Macek's Vaccine against Bovine Influenza].—*Ibid.* 320–328. [Abst. from German summary].

The summaries of these articles report good results with a vaccine of the type used by MACEK for equine influenza and for " bovine influenza ". The nature of the vaccine is not stated. [For references to " bovine influenza ", see *V. B.* **8.** 382 and 790; **9.** 171].

CAMPBELL, J. A. (1940). **Influenza Virus and the Incidence of Primary Lung Tumours in Mice.**—*Lancet.* **239.** 487.

In view of a suggestion that influenza virus, by inducing metaplasia of bronchial epithelium, might favour the development of pulmonary carcinoma, experiments were carried out in mice vaccinated intraperitoneally with influenza virus and then exposed first to a single nasal instillation of live virus and later to a cloud of carcinogenic dust at very frequent intervals over a period of a year. The incidence of lung tumours in 13 mice recovered from influenza was 15·4% as compared with 31·5% in mice not exposed to influenza and 11·3% in " non-dusted " controls. It is concluded that the virus showed a slight inhibitory effect on the development of primary lung tumours.

—R. E. GLOVER.

UNGAR, J., & HUNWICKE, R. F. (1941). **The Value of the Non-Specific Factor in Experimental Immunization with Influenza Virus.**—*Brit. med. J.* July 5th. 12–13.

In experiments with mice, polyvalent vaccines prepared against secondary organisms associated with pulmonary infections, failed to give any protection against influenza A virus. The association of bacterial vaccine, colloidal calcium or mixed lipoids with influenza virus did not favour the development of immunity against the latter.—R. E. GLOVER.

EATON, M. D., & PEARSON, H. E. (1940). **Quantitative Aspects of Homologous and Heterologous Active Immunity to Strains of the Virus of Epidemic Influenza.**—*J. exp. Med.* **72.** 635–643.

For quantitative evaluation of the relationship of different strains of epidemic influenza virus by active immunity experiments in mice, the animals have usually been immunized with constant amounts of virus and tested intranasally with serial doses. The authors, considering that this method does not bring out differences between heterologous and homologous immunity, have modified this method by injecting groups of mice with amounts of virus varying from 10–10,000 M.L.D. and by subsequently testing the immunity with a fixed dose of virus of 1–10 M.L.D.

It was found that the relationship between certain human strains was determined by common antigens which were present in the proportion of 1 part in the heterologous to about 10 parts in the homologous. On the other hand the amount of human strain antigen in swine influenza virus (Shope) was approximately 1/1,000th of the quantity in the human strain; conversely, the human strain contained only about 1/10th–1/100th as much as the swine antigen. Repeated injections of virus in mice increased the immunity to all strains, but failed to alter these ratios.—R. E. GLOVER.

GOYAL, R. K. (1940). **Investigation of Parrots in Calcutta for Presence of Psittacosis and Brazilian Virus.**—*Indian med. Gaz.* **75.** 735. [Author's summary copied *verbatim*].

An examination of 250 Indian parrots failed to reveal the presence of psittacosis, or Pacheco's virus. [See also *V. B.* **3.** 704.]

SORDELLI, A., & SAVINO, E. (1940). El aislamiento del virus de la psitacosis y la fijación del complemento con el suero de los enfermos. **[Isolation of the Virus of Psittacosis. Complement Fixation with the Serum of Human Patients].**—*Rev. Inst. Bact., B. Aires.* **9.** 448–453.

The authors describe studies made during an outbreak of psittacosis in human beings in Buenos Aires.—MILLER WATSON.

TOMLINSON, T. W. (1941). **An Outbreak of Psittacosis at the National Zoological Park, Washington, D.C.**—*Publ. Hlth Rep., Wash.* **56.** 1073–1081. [Author's summary copied *verbatim*].

An outbreak of psittacosis among birds in the National Zoological Park in Washington, D.C., is reported. Fifteen birds positive for psittacosis were discovered among 60 dying or killed during the epizootic. These consisted of 12 parrots, both South American and African, 1 finch, and 2 African doves. The technique of laboratory diagnosis of infected birds is briefly discussed. Two of the 8 bird house employees developed clinical psittacosis but have since recovered. No cases of the disease have been

reported among the general population. Control measures taken by the local authorities to eradicate the disease in the bird collection and prevent its spread to the general population have been described.

SCHOFIELD, F. W., & LABZOFFSKY, N. (1939). **A Virus Disease in Canaries.**—*Rep. Ont. vet. Coll. 1938.* pp. 41–44.

The authors describe in detail a virus disease which caused a high mortality in a large number of canaries in two aviaries; very few birds recovered. The condition resembled a pox disease in the symptoms and lesions observed. The virus was isolated by inoculation of tissue filtrates into chick embryos. It was readily obtained from filtered heart blood and could also be obtained from lung and spleen. The incubation period varied from 5–21 days. Inclusion bodies were present in great numbers in the degenerate epithelial cells of the skin and also in those of the kidney. They were the size of the nucleus of erythrocytes, like Guarnieri bodies, and contained the Prowazek elementary bodies, common to pox diseases. Mice, g. pigs, and pigeons were resistant to infection. A plate shows the skin lesions on a bird and photomicrographic sections of the lesions.—J. A. GRIFFITHS.

WEITZENBERG, R. (1939). Pockenerkrankungen bei Puten. **[Turkey Pox].**—*Tierärztl. Rdsch.* **45.** 274–276.

An outbreak of pox in turkeys, which failed to pass to chickens in contact with them, is described. Diagnosis was based on the histological appearance of the lesions (inclusion bodies). It was not possible to transmit the infection experimentally to chickens, pigeons, or canaries, so it was assumed that the turkey disease was caused by a fowl-pox virus of low virulence.—J. E.

TOPACIO, T., & SALAFRANCA, E. S. (1940). **Roup Vaccine.**—*Philipp. J. anim. Indust.* **7.** 225–234.

The authors give a brief review of the literature on roup of poultry. In view of the many species of organisms implicated in this disease, they assume that it is caused by a filtrable virus and that secondary invaders produce the variable symptoms and lesions. They prepared a bacterin in 1935 using a mixture of suspensions of *Pasteurella aviseptica* (50 parts by volume) and 10 parts each of *Pseudomonas aeruginosa, Bacterium coli, Staphylococcus aureus, Staph. albus,* and *Streptococcus* sp., all being isolated from natural roup cases and standardized to No. 10 McFarland's nephelometer before admixture. Field vaccinations of about 13,000 chicken, chiefly 1–3 months old, during 1939 are briefly commented on without the results being stated. The consensus of opinion of those using the vaccine has been favourable.
—C. V. WATKINS.

SMADEL, J. E., WARD, S. M., & RIVERS, T. M. (1940). **Infectious Myxomatosis of Rabbits. II. Demonstration of a Second Soluble Antigen Associated with the Disease.**—*J. exp. Med.* **72.** 129–138. [For part I, see *V. B.* **8.** 289].

A second serologically distinct soluble antigen is obtainable from the skin of infected rabbits and also from the serum of animals acutely affected with the disease. It has similar properties to the antigen already described [see *V. B.* **9.** 391]. They are, however, precipitated by different concentrations of ammonium sulphate and can be separated by this means.
—J. S. PATERSON.

FRIEDEWALD, W. F. (1940). **Identity of "Inhibitor" and Antibody in Extracts of Virus-Induced Rabbit Papillomas.**—*J. exp. Med.* **72.** 175–200.

The experiments reported show that the "inhibitor" which is often present in virus-induced rabbit papillomas is identical with antiviral antibody present in the bloodstream. The following facts demonstrate this:–(1) when antiviral antibody is absent from the bloodstream of the host, "inhibitor" cannot be demonstrated; (2) the "inhibitor" fixes complement in mixture with the papilloma virus in proportion to its neutralizing capacity; (3) it is specifically absorbed from extracts by the papilloma virus; (4) it specifically neutralizes the infectivity and complement-fixing antigen of a virus-containing filtrate; (5) the "inhibitor", like the antiviral antibody, has no effect on the course of the papillomas; and (6) both the "inhibitor" and the antiviral antibody are inactivated by heating at 80°C. for 30 min. and they are precipitated together on treatment with ammonium sulphate.

There is a quantitative relationship between the "inhibitor" and the antiviral antibody, the titre of the former being roughly one-quarter to one-eighth of the latter.

Since perfusion of the papillomas does not

reduce the amount of "inhibitor" present, it is surmised that the "inhibitor" represents antibody that has become localized in the papilloma tissues.

It is of interest to note that, as a general rule, extracts of papillomas of domestic rabbits are rich in "inhibitor" while most of the virus is "masked". In wild cottontail rabbits the reverse is the case. F. assumes that in the papillomas there is a continuous process of specific absorption whereby the agent which is quantitatively in excess, be it antibody or virus, can be demonstrated readily. [No explanation of the marked difference in reaction between the two types of rabbits is given.]

This extravasated papilloma virus "inhibitor" is similar to inhibitors which have been described for certain slow-growing fowl tumours and those which have been recovered from the nasal secretions of human beings convalescent after influenza.—J. S. PATERSON.

KIDD, J. G. (1940). **Effect of Extravasated Antibody upon Antigenicity of Extracts of Virus-Induced Rabbit Papillomas.**—*Proc. Soc. exp. Biol., N.Y.* **43.** 770–772.

The experiments reported demonstrate that antibody can extravasate into virus-induced papillomas of wild and domestic rabbits. It neutralizes the virus liberated when the growths are ground up and renders the virus both non-pathogenic and non-antigenic. Thus false results may be obtained in experiments to determine the presence of virus in virus-induced papillomas, unless the effects of the extravasated antibody can first be excluded.

—J. S. PATERSON.

COLES, J. D. W. A. (1940). **Conjunctivitis of the Domestic Fowl and an Associated Rickettsia-like Organism in the Conjunctival Epithelium.**—*Onderstepoort J. vet. Sci.* **14.** 469–478.

Several natural cases of conjunctivitis in fowls associated with a rickettsia infection are described. Transmission to susceptible fowls was successful experimentally, typical cases being produced in up to 75% of the birds. A description of the parasite illustrated by a number of photomicrographs is given. It was found that when recovery took place an eye could be reinfected eight months later. When one eye was infected the other sometimes developed the infection as well. Attempts at treatment with drugs such as uleron and M & B 693 were unsuccessful. The treatment was tried on account of the satisfactory results obtained in the case of sheep with heartwater (*R. ruminantium* infection).—E. M. ROBINSON.

ALEXANDER, R. A., MASON, J. H., & NEITZ, W. O. (1939). **Studies of the Rickettsias of the Typhus-Rocky-Mountain-Spotted Fever Group in South Africa. I. Isolation of Strains.**—*Onderstepoort J. vet. Sci.* **13.** 19–23.

ALEXANDER, R. A., & MASON, J. H. (1939). **Studies of the Rickettsias of the Typhus-Rocky-Mountain-Spotted Fever Group in South Africa. II. Morphology and Cultivation.**—*Ibid.* 25–39.

MASON, J. H., & ALEXANDER, R. A. (1939). **Studies of the Rickettsias of the Typhus-Rocky-Mountain-Spotted Fever Group in South Africa. III. The Disease in the Experimental Animal. Cross-Immunity Tests. IV. Discussion and Classification.**—*Ibid.* 41–65 and 67–76.

I. The first article of the series is devoted to a description of the rickettsia strains with which experiments were carried out. Five strains were obtained, one ("Appleton") from a dog showing febrile symptoms, the second ("Hare") from a hare in Pretoria district, the third ("Robertson") from a human case of tick-bite fever, the fourth, a rat-typhus rickettsia, from the Public Health Laboratory, Cape Town, and the fifth, a strain of *fièvre boutonneuse*, from the Pasteur Institute of Tunis. The methods by which these strains were maintained in g. pigs and the technique used for isolating the first two strains are described.

II. The experiments detailed here were carried out on the five strains described in I. The technique of cultivation on the chorio-allantoic membrane of the chick embryo is described. Several points of great interest were brought out during the work. It was thought that it might be possible to produce the organisms in sufficient numbers to make antigens for serological tests, etc., but the multiplication proved to be too irregular for this. The organisms could be divided into two groups according to their arrangement in the cytoplasm of serosa cells in the g. pig and on cultivation. Morphological differences exist between the strains. There was some evidence that strains "Hare", "Appleton", "Robertson", and *fièvre boutonneuse* could be put into Pinkerton's Rocky Mountain spotted fever

group and the rat-typhus strain into his typhus group.

II. This article deals with the effect of the various typhus strains on the g. pig, rat, mouse, rabbit, dog, sheep, and ox. Rat typhus could be maintained in g. pigs and rats but not in sheep, dogs or mice. With the exception of "Hare" it was possible to maintain the strains only by using cultures from the chorio-allantoic membrane of the developing chick. A Weil-Felix reaction was obtained with the sera of rabbits inoculated with rat typhus, "Hare", and tick-bite fever strains. With rat typhus, OX19 was the only one regularly agglutinated. "Hare" gave very little agglutination with any of the three *Proteus* types OX19, OXZ, and OXK. Serum from one of seven rabbits inoculated with tick-bite fever gave doubtful agglutination with OX19.

Attempts to neutralize the various rickettsias *in vitro* gave unsatisfactory results.

Cross-immunity experiments in g. pigs permitted the following grouping of the five typhus strains :– (a) rat typhus immunized against itself and to a great extent against the other four, and (b) the other four gave almost complete reciprocal cross-immunity but did not immunize against rat typhus.

IV. In this concluding article the findings are summarized with regard to classification of the diseases. The possibility that the strains might have been incorrectly labelled is admitted, but there appeared to be no good reason to think that such was the case. The five strains appeared to fall into two distinct groups when all the criteria for judging them were taken into account. The murine, endemic or rat typhus strain falls into the typhus group, and the strains "Robertson", "Appleton", "Hare", and *fièvre boutonneuse* into the Rocky Mountain spotted fever group. No change in the name "tick-bite fever" is suggested, but it was considered that in honour of its discoverer the name *Dermacentroxenus rickettsi* var. *pijperi* should be given to the parasite causing it. The authors consider that the generic name *Rickettsia* cannot be allowed for *R. ruminantium*, *R. ovina*, *R. bovis*, and *R. canis*, but no new generic name is suggested pending the completion of adequate comparative studies.—E. M. R.

Davis, G. E. (1940). ***Rickettsia diaporica*: Its Persistence in the Tissue of *Ornithodoros turicata*.**—*Publ. Hlth Rep., Wash.* **55.** 1862–1864. [Author's summary copied *verbatim*].

1. *Rickettsia diaporica* may survive in the tissues of *Ornithodoros turicata* for at least 1,001 days but is not transmitted during the process of feeding; neither is it transmitted through the egg to the next generation. 2. The virulence of the organism is not adversely affected by its long residence in the tick or by prolonged fasting of the tick. 3. Tick excrement is infective.

Goyal, R. K. (1941). **The Presence of an Enzootic of Rickettsial Infection in Wild Rats of Calcutta.**—*Indian med. Gaz.* **76.** 84–86. [Author's summary copied *verbatim*].

An enzootic of typhus fever has been described in wild rats of Calcutta; this rat strain was most probably non-pathogenic to man.

Brigham, G. D., & Watt, J. (1940). **Highly Virulent Strains of Rocky Mountain Spotted Fever Virus Isolated from Ticks (*D. variabilis*) in Georgia.**—*Publ. Hlth Rep., Wash.* **55.** 2125–2126.

Two strains of Rocky Mountain spotted fever virus were isolated from ticks (*Dermacentor variabilis*) from dogs associated with a human case of the disease.

I. Ohashi, S. (1939–40). **The Origin of Bacteriophage. I. The Phage Found in Animal Organs. II. The Phage Contained in Animal Feces. III. The Relation Between Diet of Chicken and the Excretion of Phage into its Faeces.**—*J. Shanghai Sci. Inst.* Sect. IV. **5.** 1–11, 35–46 and 47–60. [In English].

I. Aseptically prepared suspensions in broth of freshly removed organs of mice and chickens or Berkefeld V filtrates of them were tested for the presence of phage by plaque formation on agar cultures of four strains of phage-sensitive bacteria. While phage occurred with equal frequency in the organs of mice and chickens, it was in general more readily found in the faeces of chickens than of mice. O. considered that the phage found in an organ was produced there.

II. The faeces of three chickens and three g. pigs fed with 5·0 c.c. of a non-specific phage filtrate were collected at intervals of 24 hours and, after filtration through a Berkefeld V candle, were tested for the presence of phage before and after incubation in broth for 24 hours at 37°C. The phage was found to be excreted

in amounts of only 1 : 1,000–1 : 100,000 of the amounts ingested. O. suggests that the phage in the ingested food was almost completely inactivated before excretion and that even in contact with phage-sensitive bacteria it was unable to multiply, if at all, as rapidly as *in vitro*.

III. Variation of the diet of chickens was shown to alter the amount of phage excreted in the faeces. Wheat bran, which produced the highest excretion of phage, was shown to owe its efficiency to both its chemical and physical properties. Intestinal irritants such as castor oil increased the excretion of phage by chickens and promoted its excretion in rabbits and g. pigs, both of which excrete phage rarely and only in very small amounts. The intestinal mucous membrane is regarded by O. as the probable source of phage.—R. O. Muir.

Pickels, E. G., & Bauer, J. H. (1940). **Ultracentrifugation Studies of Yellow Fever Virus.**—*J. exp. Med.* **71.** 703–717.

Ultracentrifuge studies of serum samples from monkeys infected with yellow fever show the presence of a material with a mean sedimentation constant of 23×10^{-13}. Such material was not found in normal monkey serum. The light-absorption technique was used, and the substance was found to have an absorption for light of wavelength $\lambda = 356$ mμ, of much greater intensity than the serum proteins. A rough correlation was found to exist between the absorption at $\lambda = 356$ mμ and the virus activity of concentrates prepared by differential ultracentrifuging.—R. A. K.

Watson, E. A. (1940). **Genetics of Viruses Pathogenic to Animals.**—*Publ. Amer. Ass. Adv. Sci.* No. 12. pp. 18–21.

The characteristics shared by viruses and bacteria, and those more specifically associated with the former, are briefly discussed.—H. H. S.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Ghidini, G. M. (1938). Ditteri ematofagi dell'Africa Orientale Italiana. Gen. *Tabanus* (s.l.). **[The Blood-Sucking Diptera of Italian East Africa. Genus *Tabanus* (*sensu latu*)].**—*Riv. Biol. colon.* **1.** 321–364. [English, French and German summaries]. [Abst. in *Rev. appl. Ent.* **27.** 142, copied *verbatim*].

The literature on the part played by Tabanids as vectors of diseases of man and animals in various parts of the world is briefly reviewed, and a key is given to the species of *Tabanus* recorded in Italian East Africa, together with description of all the species, two of which are new, and notes on their local distribution.

Dinulesco, G. (1938). Contribution à l'étude des hypodermes en Roumanie et des préjudices qu'ils causent à l'industrie de la pelleterie. **[Ox Warble Flies in Rumania].**—*Ann. Inst. nat. zootech. Roumanie.* **6.** Reprint pp. 36. [In French].

D. discusses the losses caused by warbles. Nearly 18% of skins examined were parasitized, the proportion varying from 3–53% in different regions. Animals 1–2 years old were most heavily parasitized.

The second, third, and fourth stages appeared under the skin from the beginning of February to the end of May. The pupal stage lasted 17–23 days for males and 15–26 days for females. Adults appeared from the first days of July to early August. The adult longevity was 2–14 days. The later stages of the larva, particularly the buccal armature, are described, and histological observations are recorded of the tumours containing living larvae and also of the "winter tumours" containing dead larvae.—J. MacLeod.

Fallis, A. M. (1940). **Studies on *Oestrus ovis* L.**—*Canad. J. Res.* Sect. D. **18.** 442–446.

F. examined, over a period of a year, 698 slaughter sheep and lambs, one year old and under, and found that 50% were infested with *O. ovis*. A higher incidence would be obtained if the total were to include only the older animals, for over 90% of those examined from August to May were infected. F. described the larvae and found that adult flies lived for about 16 days (one lived for 28 days). The maggots caused a definite irritation in young animals and produced a purulent condition of the sinuses.—T. W. M. Cameron.

Mönnig, H. O. (1940). **Blowfly Strike in Sheep. A New Line of Treatment and Prevention. (Preliminary Note).**—*J. S. Afr. vet. med. Ass.* **11.** 142–150.

In briefly describing some of the conditions which lead up to blowfly strike in sheep, M. observes that alkaline conditions of the fleece are absolutely necessary. In some preliminary experiments it was shown that 10% wattle bark extract, which is strongly acid and astringent, prevented strikes better than any other substances tried. Petrol and benzene could be emulsified in the 10% wattle bark extract, but only the benzene emulsion was found to be satisfactory for killing maggots of *Lucilia cuprina* and *L. sericata*.

Mention is made of the role of maggots in the treatment of wounds, and M. was able to confirm the observation that, after the removal of the maggots, wounds kept acid healed more rapidly than those kept alkaline. Reference is made to *Tagetes* [African marigold] oil as a blowfly repellent but it failed to prevent a re-strike during a bad wave of blowfly attack.
—E. M. ROBINSON.

CALZADA, V. C. (1940). Sobre existencia de Dermatobia cyaniventris. **[The Existence of *D. cyaniventris* in Uruguay].**—*Bol. mens. Direcc. Ganad., Montevideo.* **24.** 430–436.

C. reports the existence of myiasis caused by *D. cyaniventris* in sheep and cattle, including calves, in Uruguay. He describes the known life-cycle and discusses curative and preventive measures.—MILLER WATSON.

BUXTON, P. A. (1939). **The Louse. An Account of the Lice Which Infest Man, Their Medical Importance and Control.** pp. ix + 115. 1 appendix. London: Edward Arnold & Co. [8vo] [7s. 6d.]

In this little book, B. has condensed all the available knowledge of human lice and of the diseases they transmit. Although lice of domestic animals are not dealt with, the book may be of comparative interest to veterinarians. As an example may be cited the excellent short summary of rickettsial diseases and their vectors given in chapter 4. Some of the laboratory methods of handling experimental lice given in the appendix are, of course, equally applicable in work on lice of domestic animals.
—E. S.

I. BUXTON, P. A. (1940). **The Louse: Present Knowledge and Future Work.**—*Trans. R. Soc. trop. Med. Hyg.* **33.** 365–388.

II. BUXTON, P. A. (1940). **Temperatures Lethal to the Louse.**—*Brit. med. J.* March 2nd. 341.

III. BUXTON, P. A. (1940). **The Control of Lice.**—*Ibid.* Nov. 2nd. 603–604.

I. The available information is briefly summarized, and the question of control methods examined in detail. The value of combing is stressed. Ten days is the limit for survival of fasting lice at ordinary temperatures [for the effects of heat, see II]. Phenol and cresols at 2% kill lice and nits. Kerosene, diluted with cottonseed oil, or emulsified with soap and water, is useful. For fumigation, sulphur dioxide, which is not ordinarily an insecticide, is effective against head lice. The vapour of naphthalene is also highly toxic.

II. Adults or larvae are killed by exposure to 51 5°C. for 5 min., 49·5°C. for 10–30 min., and 46°C. for an hour. Eggs, under five days old, are slightly more resistant, but are killed by 5 min.'s exposure to 53·5°C.

III. Methods of control are reviewed. In addition to the substances previously reported [see I], 70% alcohol is effective against head lice. For body lice control, the body should be lathered with soap and cresol (2·5%). Clothes are disinfested by heat and by storage; the period of storage necessary to ensure starvation varies from one month at 24°C. or below, to ten days at 35°C.—J. MACLEOD.

HOYLE, W. L. (1938). **Transmission of Poultry Parasites by Birds with Special Reference to the "English" or House Sparrow and Chickens.**—*Trans. Kans. Acad. Sci.* **41.** 379–384.

The examination of 567 sparrows collected from different habitats such as in or about chicken pens, in barns, and in wheat fields showed that they were relatively free from ectoparasites. Less than 10% were infested with mites, the sparrow louse was found on three, and the chicken louse *Lipeurus heterographus* on one.

Examination of sparrows' nests showed the presence of mites in the majority of those lined with chicken feathers. Nests not so lined contained no mites.

Chicken lice, *Menopon gallinae*, placed on sparrows were found to remain on them up to a maximum of nine days.

The caging of parasite-free sparrows with lice-infested chickens resulted in some infestation of the sparrows. This infestation could

have been through direct contact or indirectly through the dust bath.

It is concluded that the dust bath is a probable source of infestation of sparrows with chicken lice and that sparrows transmit them from one fowl house to another.—W. J. IRONSIDE.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

CARLO, R. (1939). Prima nota sugli elminti della regione dello Scioa. [**Helminth Parasites of Animals around Shoa, Abyssinia**].—*Nuovo Ercol.* **44.** 374–381.

This is a survey of the helminth parasites of the Shoa district of Abyssinia, the less common parasites being described. Those isolated from horses and mules included *Anoplocephala perfoliata*, *Habronema microstoma*, *Strongylus edentatus*, *S. vulgaris*, *Oxyuris equi*, and various species of sclerostomes.

From zebu cattle the following were isolated :– *Paramphistomum cervi*, *Fasciola hepatica*, *F. gigantica*, *Dicrocoelium* sp., *Dictyocaulus viviparus*, *Bunostomum phlebotomum*, *Oesophagostomum radiatum*, *Trichuris ovis*, and *Onchocerca gibsoni*.

From dogs *Dipylidium caninum*, *Toxocara canis*, and *Ancylostoma caninum* were isolated. *Cittotaenia pectinata* was found in rabbits. *Hymenolepis villosa*, *H. serrata*, and *Ascaridia galli* occurred in poultry.—MILLER WATSON.

KOUTZ, F. R. (1941). **A Comparison of Flotation Solutions in the Detection of Parasite Ova in Feces.**—*Amer. J. vet. Res.* **2.** 95–100.

K. has compared the relative efficiency of five solutions recommended for the flotation of parasitic ova in the diagnosis of helminth infections. Details are given of the preparation of the solutions used, which were those of $NaNO_3$, $ZnSO_4$, $MgSO_4$, NaCl, and cane sugar with specific gravities of 1·400, 1·380, 1·285, 1·200, and 1·275 respectively. Faecal specimens from dogs were used in the tests. A 10-min. direct flotation method gave approximately twice the number of ova as a 5-min. direct flotation, while a centrifugal flotation method was markedly superior to both of the direct flotations. $NaNO_3$ solution gave a higher average and individual egg count per gramme than any of the other solutions. A fault of the $NaNO_3$ solution was, however, that unless carefully handled and poured it developed numerous air bubbles which obscured the eggs. Also, considerable debris floated with this solution, especially with the centrifuge method, but this drawback was partly overcome by spreading the material over the entire slide for counting purposes. This fault gave the $ZnSO_4$, $MgSO_4$, and sugar solutions a better diagnostic value with the centrifuge method. More ova were crushed with the $ZnSO_4$ than with any other solution, while sugar solution produced few crushed ova, debris, or bubbles. Ova of low specific gravity floated well with NaCl solution in all tests, but with heavier ova, *e.g.* of *Trichuris* and of *Troglotrema salmincola*, this solution gave inferior results. K. stresses the importance of thoroughly mixing the faeces and the flotation solution, especially that of sugar, as otherwise relatively few ova appear. —J. N. OLDHAM.

ALICATA, J. E., SWANSON, L. E., & GOO, G. W. H. (1940). **Methods of Controlling the Liver Fluke of Cattle in Hawaii.**—*Circ. Hawaii agric. Exp. Sta.* No. 15. pp. 23. 1 appendix.

The authors conclude that *Fasciola gigantica* may be best combated by measures against the snail carrier, *Fossaria ollula*, a common inhabitant of fresh-water streams and swamps, by the use of " distol " (a proprietary preparation in the form of gelatin capsules, each containing 1 g. " aspidinolfilicic acid " and 10 g. hexachlorethane) or kamala as anthelmintics, and by the prevention of grazing in swamps or the feeding of grass cut from such areas. The snail may be controlled in swamps by applying 20 lb. $CuSO_4$ per acre, mixed with four times its weight of sand. In streams, a concentration of 1 : 250,000 appears most suitable ; a 24-hour maintenance of this strength is attainable by using 24 lb. $CuSO_4$ per sq. ft. of cross section per unit velocity in feet per second and is effective for about a mile. The authors recommend as an effective dose of " distol " one capsule per 70 lb., and of kamala 10 g. per 60 lb., body weight, the dose in each case being spread over 3–4 successive days. " Distol ", though more costly, is considered to be superior to kamala as it is less toxic and requires less time to administer ; it should be used for dairy cows. Kamala is suggested mainly for beef cattle.

An appendix gives details of treatment and a

table of weights of beef cattle in terms of heart-girth measurements.—J. N. OLDHAM.

ALICATA, J. E. (1941). **Studies on Control of the Liver Fluke of Cattle in the Hawaiian Islands.**—*Amer. J. vet. Res.* **2.** 152–164.

About 50% of beef and 80% of dairy cattle in the Hawaiian Islands are infested with *Fasciola gigantica*. Besides control of the snail carrier, *Fossaria ollula*, by broadcasting copper sulphate in streams and swamps, a biological method has been suggested, *viz.* the utilization of firefly (*Luciola* spp.) larvae which feed on freshwater snails and other invertebrates. These insects have been introduced into suitable localities where it is hoped that they will become established. Access of cattle to infested pastures is prevented by suitable fencing, and A. suggests the making of silage as a means of destroying encysted cercariae. As anthelmintics, "distol", kamala, and hexachlorethane alone and combined with kamala are most effective. An egg-counting technique has been devised to determine the fluke egg output per gramme of faeces and to estimate the efficacy of the various anthelmintics.—M. L. BINGHAM.

MACCHIONI, I. (1939). Le ghiandole emolinfatiche nella distomatosi epatica degli ovini. [**The Haemolymph Nodes in Sheep with Liver Fluke Infestation**].—*Nuova Vet.* **18.** 8–16.

M. studied the haemolymph nodes in a large number of slaughter sheep, both healthy and infested with liver flukes. He describes the normal haemolymph nodes as of three types, one with cortical follicles, another with follicles in both cortex and medulla, and a third with no follicular structure. Their principal function appears to be the destruction of effete red cells, and this is associated with some leucopoietic activity.

In fluke-infested sheep the nodes are larger and more numerous, and their structure is follicular in both medulla and cortex. Their function in disease appears to be leucopoietic and erythropoietic, in addition to increased activity in the destruction of effete red cells.
—MILLER WATSON.

CARTA, A. (1938). La tetratiridiosi dei carnivori domestici ed il ciclo evolutivo del "Mesocestoides lineatus". [*Tetrathyridium bailleti* **Infestation of Dogs and Cats and the Development Cycle of** *M. lineatus*].—*Clin. vet., Milano.* **61.** 121–128.

Over a period of eight years, C. observed four cases of *T. bailleti* infestation among hundreds of dogs examined P.M. in Sardinia; two further cases were found in cats. Two of the dogs had only four and six of the larvae, respectively, lying free in the peritoneal cavity.

The other two dogs and the cats were heavily infested with some hundreds of parasites each. In them, C. was able to distinguish three forms of the parasite. Lying free in the abdominal and pleural cavities, or enclosed in groups of 2–4 in sacs suspended from the omentum were large numbers of typical, elongate tetrathyridia. In the walls of the small and large intestines, in the mesenteric and hepatic lymph nodes, and in the liver and lungs, were numerous spheroidal cavities varying from the size of a millet seed to that of a small pea. The smaller of these cavities contained vesicular larvae resembling *Cysticercus cellulosae*; the parasites in the larger cavities, on the other hand, were solid and either globose or heart-shaped. Examination of the three types of larvae showed in each case the typical *Mesocestoides* scolex, *i.e.* devoid of hooks or rostellum but having four elliptical suckers. C. is of the opinion that they represent successive stages in the larval development, of which the vesicular form is the earliest and the tetrathyridium the most highly developed.

As tetrathyridiosis was relatively rare in dogs and cats in Sardinia, whereas *M. lineatus* infestation was frequently found, C. concludes that dogs and cats are only aberrant intermediate hosts. Attempts to discover the true intermediate host gave no results, and mice, rats, rabbits, fowls, cockroaches, etc. failed to become artificially infected with tetrathyridia.
—E. S.

GASSNER, F. X., & THORP, F., Jr. (1940). **Studies on Thysanosoma Actinioides.**—*J. Amer. vet. med. Ass.* **96.** 410–411.

The authors found that detached segments of this tapeworm, as found in either the small or large intestine of infested lambs, contained encapsulated oval bodies, each enclosing 7–12 embryonating ova. The terminal segments of mature worms from the same lambs never contained such capsules, and it was shown that they represent a later stage of development, the wall of the capsule being constituted by the parauterine pouch. The embryo is of the hexacanth type.—E. S.

GASSNER, F. X., & THORP, F., Jr. (1940). **Studies on Thysanosoma Actinioides, Part II.**—*Amer. J. vet. Res.* **1.** 36–43. [See also preceding abst.]

A historical review of the species is given, together with a description of the reproductive organs of the proglottids and the development in detached gravid segments of embryonated ova encased in heavy fibrous capsules, the latter appearing to afford excellent protection against external influences. Detailed descriptions and measurements are given of these capsules and of the hexacanth embryos, which lack the pyriform structures common to embryos of *Moniezia* spp. Measurements of the entire cestodes are also given.—K. M. SANDERSON.

LEONARD, A. B. (1940). **The Accelerated Tissue Response to *Cysticercus pisiformis* in Passively Immunized Rabbits.**—*Amer. J. Hyg.* Sect. D. **32.** 117–120.

Young rabbits were passively immunized against *C. pisiformis* by intravenous injections of serum from rabbits heavily infected four weeks previously, and 24 hours later they were given 2,000 eggs of *Taenia pisiformis*. The animals were killed at intervals of 1–22 days after infection; the tissue reactions of the livers were studied by means of serial sections and were compared with normal livers. In the immunized rabbits a rapid host-tissue response was observed which resulted in the presence of numerous fibrocytes by the 4th day, and in encapsulation of the developing larvae by the 6th or 7th day. Polymorphs were absent but large macrophages were very numerous in the lesions. Comparatively few larvae appeared to reach the liver and the early tissue response resulted in a mortality as high as 100% among those which did reach the liver.—M. L. B.

SCHAAF, J. (1941). Vorkommen und Verbreitung der Trichinose im Generalgouvernement Polen. **[Trichinosis in German-Occupied Poland].**—*Berl. Münch. tierärztl. Wschr.* March 14th. 131–133.

S. has computed that, from statistics available since 1936 for the Warsaw, Cracow, and Lublin districts, the incidence of trichinosis in pigs in German-occupied Poland varies from 0·18–0·84 per 1,000, with an average of 0·68 per 1,000, of all pigs slaughtered. This is about one hundred times the incidence of the disease in the German Reich and is mainly due to the lack of trichinosis inspection in private abattoirs. In S.'s experience, the disease is more widespread in the east and north-east (Lublin and Warsaw districts) than in the south-west (Cracow district). In contrast to pigs kept in styes, S. points out that wild pigs and those on free range have abundant opportunity of becoming infected from the flesh of carnivores and omnivores. Of 1,209 dogs killed, 1% were found to be infected; the disease is thus about 14 times as common in dogs as in pigs and the incidence 9–12 times as high as in dogs in the Reich. As carriers of *Trichinella*, S. stresses the importance of dogs which, although they may not transmit the disease directly to pigs, may act as a medium for spread to other animals. The numerous cases of human trichinosis reported during and after the Polish campaign are considered as due to the consumption, against regulations, of raw pork not inspected for trichinosis.—J. N. OLDHAM.

BUGGE. (1941). "Muskel- und Herztrichine". **[Muscle and Heart Trichinosis].**—*Dtsch. tierärztl. Wschr.* **49.** 65.

B. points out that it is possible to differentiate the sexes, by means of the genital anlage, of *Trichinella spiralis* larvae present in musculature, although it is generally stated in helminthological literature that sex differentiation is possible only in specimens present in the gut. He also discusses the question of the rarity with which trichinae are found in heart muscle. Since they are scarce and not encapsulated in this organ it is generally assumed that they die, but B. and HEMMERT-HALSWICK [*V. B.* **5.** 143.] have each refuted this assumption by finding neither the degenerative stages of dead trichinae nor collections of phagocytic cells. Since sections show the larvae in the heart to be always associated with the vessels, it is argued that, owing to unfavourable conditions in the organ, *e.g.* violent movement, the worms return to the vessels to reach other muscle regions.—J. N. OLDHAM.

KELLER, H. (1941). Zur Frage der Uebertragbarkeit von Darmtrichinen durch Vogelfaeces. **[Transmissibility of Intestinal Trichinae by Bird Faeces].**—*Tierärztl. Rdsch.* **47.** 127–129.

K. fed to white rats and mice faeces positive for *Trichinella*, obtained from various birds previously fed on trichinous flesh. Four mice and three rats were given faeces passed one day

after the infective feed, while three mice and two rats received faeces passed on the second day. Transmission succeeded only in one rat given faeces passed on the first day. From this result, K. contends that transmission of trichinosis by infested faeces is of little importance. Amplifying his argument, K. mentions BUGGE's findings on the effect of gastric juice on the adult worms which are dissolved in 20–60 min., and on forms prior to the final moult which remain motile for 48 hours; he considers the time of moulting to be the deciding factor in the survival of *Trichinella* ingested from faeces. Since food, blackened with charcoal and fed to hens, appeared in the rectum after five hours and the final moult to the adult stage in *Trichinella* occurs 18–20 hours after the liberation of larvae from muscle tissue, K. points out that it is quite possible for worms, not yet moulted, to be excreted and therefore infective for a new host. Although this result may be achieved experimentally, under natural conditions the spread of trichinosis by avian faeces is of no importance.

—J. N. OLDHAM.

I. ROTH, H. (1939). **Experimental Studies on the Course of Trichina Infection in Guinea Pigs. III. Immunity of Guinea Pigs to Re-Infection with *Trichinella spiralis*.**—*Amer. J. Hyg.* Sect. D. **30.** 35–64. [For part I, see *V. B.* **10.** 598. See also *V. B.* **10.** 524].

II. MCCOY, O. R. (1940). **Rapid Loss of Trichinella Larvae Fed to Immune Rats and its Bearing on the Mechanism of Immunity.**—*Ibid.* **32.** 105–116.

III. ROSS, B. D. (1940). **Calcification of Trichina Cysts *in vitro*.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 531–536.

I. Further studies on the course of trichina infection in g. pigs showed that a high degree of immunity can be conferred by a single dose of 100–500 larvae of *T. spiralis*. Such g. pigs were able to withstand a test dose of 2,000 larvae three weeks to seven months later. By another series of experiments, R. showed that this immunity is primarily due to a defensive mechanism of the intestine, which is directed against the number and longevity of the adult worms and becomes fully effective in the small intestine during the second week after infection. A purely intestinal infection with a few worms of either sex alone, where no muscular invasion occurs, can produce an acquired immunity against a normal infection.

II. Further experiments [see *V. B.* **2.** 456.] have been made to determine the rapidity with which *Trichinella* larvae were expelled when fed to rats already immunized by three or more sublethal doses of larvae. Following the administration of test doses the rats developed diarrhoea, and within 8–18 hours most of the larvae were eliminated from the intestine. The larvae found in the faeces were alive and developed normally when fed to normal rats. The expulsion of the larvae appeared to be due to an increased peristalsis and an increased secretion of mucus, and there was no evidence of any abnormal cellular reaction in the intestinal wall or of the presence of any humoral antibodies.

III. Calcification of trichina cysts *in vitro* was produced only after initiation of the calcification *in vivo*. This could be accomplished by administration of toxic doses of viosterol for 1–5½ days to rats infected with *T. spiralis* 18–277 days previously. Fixation and incubation of their diaphragms in serum then led to a marked increase in calcification, which occurred at Ca and P levels well below the critical point for the calcification of rachitic cartilage. Viosterol appeared to act by virtue of its toxic effect on the parasite or its cysts rather than by increasing the absorption of Ca and P. An enzyme was present in the cysts before administration of viosterol, which did not alter its concentration or its distribution.

—M. L. BINGHAM.

HOLL, F. J., SIMON, A. J., & HECTOR, L. G. (1940). **The Effect of Short Electric Wave Radiation on the Development of *Trichinella spiralis*.**—*Amer. J. Hyg.* Sect. D. **31.** 32–36.

Twenty-five rats used in these experiments were divided into two groups, one containing rats experimentally infested with *T. spiralis* larvae subjected to irradiation at a frequency of 8·47 megacycles, and the other rats experimentally infested with larvae exposed to irradiation at a frequency of 4·75 megacycles; each group contained also control rats experimentally infested with non-irradiated larvae. Six days after infestation the animals were killed and the adult worms in the intestine of each animal counted. The number of adults which developed in the control rats was greater than the number found in the rats infested

with the irradiated larvae; the number of larvae killed by the effect of the higher range of the frequencies was 40% and those by the lower range 47·6%. These results indicate that high-frequency irradiation has a marked retarding effect on the development of *T. spiralis*. The mechanism of the effect is not known, but it is suggested that, as no heat changes were observed, the inhibitory or lethal effect was due to electromechanical vibrations set up in the living cells of the trichinae or to the rearrangement of the molecular structure of the protoplasm of the cell.—R. ALLCROFT.

MILLER, M. J. (1941). **Quantitative Studies on *Trichocephalus vulpis* Infections in Dogs.**—*Amer. J. Hyg.* Sect. D. **33.** 58–70.

M. found that there is no age resistance to whipworm infestation in dogs, but that an acquired resistance may occur. The egg output per worm is greater in light than in heavier infections. In one animal a diet of canned salmon appeared temporarily to stimulate the egg output and, subsequently, the elimination of most of the worms.—T. W. M. CAMERON.

MAYHEW, R. L. (1940). **Studies on Bovine Gastro-Intestinal Parasites: IV. Influence of Hay Consumption on Egg Counts.**—*Cornell Vet.* **30.** 495–498. [For part II, see *V. B.* **11.** 375. Part III not traced].

The parasites concerned were *Bunostomum phlebotomum*, *Oesophagostomum radiatum*, and *Haemonchus contortus*. Evidence was obtained which showed that decreased consumption of hay resulted in increased egg counts, the time required to effect the change being 1–3 days. —A. L. WILSON.

MÖNNIG, H. O. (1940). ***Marshallagia marshalli* (Ransom, 1907) Orloff, 1933 and a New Species of this Genus from Sheep in South Africa.**—*Onderstepoort J. vet. Sci.* **14.** 115–119.

In the course of a survey of the Union of South Africa to study the distribution of *Gaigeria pachyscelis*, eggs of *Ostertagia* (*Marshallagia*) *marshalli* were encountered. These eggs were found only in samples of sheep faeces from the Karroo in the Calvinia, de Aar, and Beaufort West areas, where the rainfall is very low. The worms themselves are mainly found close to the omaso-abomasal opening. A detailed description of the worm is given and also a short note on a single male specimen which was found amongst the *M. marshalli* specimens, and considered to represent a new species, *M. brevispiculum*.—E. M. ROBINSON.

WILSON, S. G. (1940). ***Thelazia Rhodesi* as a Primary Cause of Ophthalmia in Cattle in Nyasaland.**—*J. S. Afr. vet. med. Ass.* **11.** 158–160.

T. rhodesi has been observed in the conjunctival sacs of cattle from all parts of Nyasaland. Clinical symptoms of conjunctivitis occur without the presence of the worm and it should not be incriminated in this affection until all other causes have been eliminated. Rickettsia infection of the conjunctival mucous membrane has not been observed in Nyasaland. —E. M. ROBINSON.

IMMUNITY

TAKEDA, Y., OHTA, T., & SATO, M. (1940). Ueber die biologische Wirkung der Azetyl-polysaccharide aus Tuberculin. **[The Biological Action of Acetyl Polysaccharide Obtained from Tuberculin].** —*Z. ImmunForsch.* **98.** 297–305. [Translation of summary].

When acetyl polysaccharide obtained from tuberculin was tested as an antigen in the precipitation and allergic reactions on tuberculous g. pigs, weakly positive reactions developed.

The injection in large amounts (300 mg.) of the polysaccharide into tuberculous g. pigs caused shock in the same way as tuberculin.

PIELSTICKER, H. (1938). Ueber die Verwendbarkeit der Komplementbindungsreaktion bei der Rindertuberkulose. **[Use of the Complement-Fixation Test for Bovine TB.]**—*Inaug. Diss., Leipzig.* pp. 40.

P. made c.-f. tests, using BELLER'S antigen as well as that of WITEBSKY *et al.*, on 178 cattle diagnosed clinically as tuberculous and on 198 slaughter cattle.

The serological test with either antigen was nearly 100% reliable in cases of generalized TB. with haematogenous or lymphogenous forms of infection, but was very unreliable in cases of localized TB., and consequently

cannot be recommended in general TB. eradication work.—J. E.

SEELEMANN, M., & PFEFFER, A. (1939). Zur Serodiagnose der Bruzellose des Rindes. **[Sero-Diagnosis of Bovine Brucellosis].** —*Dtsch. tierärztl. Wschr.* **47.** 677–680.

The authors discuss the various methods used in Germany for the serological diagnosis of brucella infection in cattle, *viz*, for blood the rapid slide method and the tube method, and also the flocculation reactions introduced by MEINICKE and by SACHWEH, and for milk, the same methods and the ring test of FLEISCHHAUER. A few notes are added on cultural methods for milk. A table is given of the diagnostic criteria recommended for blood from which it appears that several methods may be used for the same sample. A negative result to the slide agglutination method is accepted as proof that the animal is not infected. If a positive result (of any intensity) is obtained, a tube test is done. If the titre is 1 : 40 or over the result is accepted as positive. If the tube titre is under 1 : 40, a flocculation test is made. If the result of the flocculation test is positive the animal is classed as positive if the original slide test was strongly positive (+++ within 1 min.), or as doubtful if it was weakly positive. If the flocculation test is negative the animal is passed. Emphasis is laid on the fact that in clean herds tube-test reactions at 1 : 5, 1 : 10, or 1 : 20 are fewer than in the healthy sections of infected herds, and on the necessity for regarding a titre of 1 : 40 as positive. [At an earlier date with a similar test method—incidentally of about the same sensitivity as that used in Great Britain—a titre of 1 : 100 was the lower positive level, but this was later dropped to 1 : 50 and the authors now recommend 1 : 40.]

Discussing the diagnostic titres from milk, the authors disagree with the official criteria, expressing the view that milk from certainly uninfected cows is normally negative at 1 : 5, that positive results at 1 : 5 or 1 : 10 are usually associated with blood reactions, and that a titre of 1 : 5 in herd milk is strong presumptive evidence of infection in the herd. Flocculation reactions are regarded as unnecessary for milk. A table of diagnostic criteria is given. Samples are first tested by the ring method, a definitely negative or positive result being accepted. In doubtful cases a tube test with whey and a Sachweh flocculation test is put up, a reaction at 1 : 5 and a positive flocculation result being accepted as positive. For cultural tests 1 : 20,000 victoria blue is preferred to a combination of 1 : 300,000 gentian violet and 1 : 600,000 malachite green.—A. W. S.

SEELEMAN, M., & MANTOVANI, G. (1939). Ueber die Abortus Bang-Ringprobe (ABR.) und ihre Reichweite bzw. Sicherheit im Vergleich zu anderen serologische Verfahren. **[The *abortus* Bang Ring (A.B.R.) Test; its Range and Reliability Compared with Other Serological Methods].**—*Milchw. Forsch.* **20.** 95–109.

The authors examined a series of milk samples by the ordinary tube agglutination method, the rapid slide method, the so-called Sachweh reaction (S.R.) and the so-called *abortus* ring test (A.B.R.) with the primary purpose of assessing the range and reliability of the latter. They examined 212 samples of whole milk including cow and quarter samples, 100 samples of bulk milk, and an unstated number of samples of pasteurized milk. The A.B.R. test is the test put forward by FLEISCHHAUER [*V. B.* **8.** 656.] in which a small quantity of haematoxylin-stained, dense suspension of brucella is added to a small volume of milk, shaken, and allowed to stand for 15 min. to two hours. A positive reaction is shown by a violet ring at the surface of the column of milk produced by the presence of agglutinated masses of stained brucella carried up by the fat globules. The test is also reputed to be of value for skim milk, the brucella then being deposited. Pasteurized milk can also be tested, although the rising of the fat globules is slowed. The authors found that the reaction must be read within 30 min. (apparently at 37°C.). Obvious floccules appear within 10–15 min. in most cases and are followed by decolorization of the milk and ring formation within 30 min. Slower reactions are, in their opinion, of doubtful significance because even in samples from known negative cows some ring formation occurs, although without decolorization of the milk.

They obtained results closely parallel to those given by the other tests and conclude that the test is a valuable one for orientating purposes, being more reliable than the rapid slide method, especially for mixed or bulk milk samples, and carried out quickly and without equipment by relatively unskilled workers.

Stress is laid on the necessity of having a well stained and washed test suspension free from clumps of organisms. The test was not, however, as claimed by certain other workers, superior to the ordinary tube method, primarily because it gives no information regarding titre of agglutinins. Like other tests it may be interfered with by alteration in the chemical or physical characters of the milk.—A. W. S.

GREEN, W. (1938). Untersuchungen über die Brauchbarkeit der Flockungsreaktion zur Ermittlung bangpositiver Milchproben. [**Value of the Flocculation Test in Detecting Brucella Infection in Milk**]. —*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **136.** 115].

The Meinicke test agreed with the slow (tube) agglutination test in 93·2% of 970 samples of whole milk; the Sachweh test was not satisfactory. When milk serum was used, however, the Sachweh test gave better results than the Meinicke test. The flocculation test cannot be used for testing dry secretions, colostrum, and mastitis milk. Experiments with heat-treated milk showed that the agglutinins are weakened by heat and destroyed by very high temperatures, and can no longer be demonstrated.

KOLLÁR, K. (1938). Vergleichende Untersuchungen über den diagnostischen Wert der Flockungsreaktion nach Jullien und Laurent beim seuchenartigen Verwerfen der Rinder. [**Comparative Study of the Diagnostic Value of Jullien and Laurent's Flocculation Test in Bovine Brucellosis**].—*Wien. klin. Wschr.* **51.** 708–709.

The alcoholic antigen used in Jullien and Laurent's test keeps well, so that the test may be more convenient than the ordinary agglutination test in which a more perishable antigen is used. From the results of comparative tests on 137 sera, however, K. concludes that the J & L test cannot be recommended as it gave many negative results with sera adjudged positive by the aggln. test.—J. E.

*PANKRATOV, A., & PHENELONOVA, Z. (1939). **Contributions to the Diagnosis of Brucellosis in Sheep.**—*Arch. biol. Nauk.* **53.** 81–89. [In Russian: English summary]. [Translation of abst. in *Jber. Vet.-Med.* **65.** 369].

In cases of fresh infection the agglutination test is more important than the allergic, which does not become valuable until the infection has been borne for some months. A combined test by both methods, however, ensures the greatest diagnostic accuracy.

JERSILD, M. (1941). **A Cytophagic Reaction Employed in the Diagnosis of Brucella Infection.**—*J. infect. Dis.* **68.** 16–19.

Instead of using the patient's citrated blood for diagnosis, J. uses the blood serum. This is inactivated and added to the fresh blood of a donor previously tested and found not to contain opsonin. The count is made by Huddleson's method. 0·02 c.c. of serum is used and 0·02 c.c. of a 1:10 dilution of serum, if necessary, as zones of inhibition may occur. Contrary to Huddleson's view, phagocytosis was found to occur at a very early stage of the disease. The reaction is said to be more sensitive than agglutination and complement-fixation tests. The blood does not need to be examined soon after collection. After skin tests with brucellergen [a protein nucleate fraction of brucella cells used as an allergic agent for detecting brucella skin allergy in human beings (see HUDDLESON—*V. B.* **10.** 648.)], opsonins occur, most markedly if there is already a small amount of opsonin in the blood.—S. J. G.

ALECHINSKY, A. (1939). Contribution à l'étude des phénomènes hémorragiques. [**Study of Haemorrhagic Phenomena**]. —*Ann. Inst. Pasteur.* **63.** 41–92.

A comparison was made in rabbits of the "haemorrhagic phenomena" of SANARELLI and of SHWARTZMAN [*V. B.* **2.** 464]. In the former the second of two intravenous injections of toxic filtrate, given at an interval of 24 hours, caused the appearance of generalized haemorrhages in the abdominal viscera, and in the latter an intravenous injection of toxic filtrate, given 24 hours after an intracutaneous injection of the same filtrate, produced a haemorrhagic reaction at the site of the first injection. Results showed that the Shwartzman phenomenon is a localized form of the Sanarelli phenomenon. Further experiments in rabbits proved that the Sanarelli-Shwartzman phenomenon is neither anaphylactic nor allergic in nature, since its passive transmission from rabbit to rabbit occurs only by virtue of the toxic filtrate transmitted in, and activated by, the tissue fluids taken from one animal and injected into the next. The active substance was demonstrated in much greater amounts in the toxic filtrates

from six-day broth cultures than from 24-hour agar cultures and was produced much more quickly by the colon-typhoid group and cholera vibrios than by staphylococci. The parts played by the preparatory and final injections of toxic filtrate in the production of haemorrhages are explained with experimental demonstrations. The haemorrhage-producing property was ultimately shown to be confined to the endo- and exotoxins in the cultures or their filtrates, endotoxin being the more active of the two. Results of histological examination of the lesions produced at different stages of the phenomenon are described and compared with those reported by other workers.—R. O. Muir.

Jones, L. R., & Roberts, E. C. (1941). **Studies Concerning Possible Mechanisms Involved in Experimental Serum Sickness.**—*J. Immunol.* **40.** 107–118.

The injection of a single large dose of horse serum into the ear of a rabbit produced in 4–6 days erythema and oedema of the ears lasting for 1–3 days. Since this reaction was considered analogous to serum sickness in man, an investigation was made of the mechanism involved in its production. The reaction was unaffected in its incubation period, incidence, or duration by the parenteral administration of histaminase or of rabbit anti-horse serum to rabbits which had been injected with horse serum. The injection of a small amount of horse serum into the tissue of a rabbit's ear followed by the injection elsewhere of rabbit anti-horse serum, elicited at the prepared ear site a local serum reaction not produced by heat-alkali processed horse serum unless larger amounts of antiserum were injected. Evidence is given that heat-alkali treatment of serum quantitatively reduces rather than destroys a factor in horse serum upon which the development of experimental serum sickness may depend.—R. O. Muir.

van der Scheer, J., Wyckoff, R. W. G., & Clarke, F. H. (1941). **The Electrophoretic Analysis of Tetanal Antitoxic Horse-Sera.**—*J. Immunol.* **40.** 173–177.

The examination of a series of tetanus antitoxic horse sera with the electrophoresis apparatus shows the presence of a component designated T, having a mobility between that of the β and γ globulins at pH 7·6. This component was not observed in normal horse serum.

During the course of immunization the amount of the T component increases markedly, concurrently with the appearance of high antitoxic activity in the serum.

It is suggested that the antitoxic activity is associated with the T component.—R. A. K.

Butler, G. C., Harington, C. R., Yuill, M. E., & Miles, A. A. (1940). **Studies in Synthetic Immuno-Chemistry. 5. Observations on Antisera against Aspirin-Protein Complexes.**—*Biochem. J.* **34.** 838–845.

Aspiryl protein complexes were prepared by coupling acetylsalicyl azide with serum globulins. Immunization of rabbits against aspiryl horse-serum globulin gave rise to strongly reacting antisera, the serological properties of which were specifically determined by the aspiryl-amido grouping. Such immune sera were able partly to protect rats, affected with pyrexia as the result of injection of yeast, from the normal anti-pyretic effect of aspirin. This may be regarded as demonstrating the possibility of neutralizing the effect of a pharmacologically active group with an antiserum against a protein in which this group is acting as a haptene, even though the group in question has no chemical connexion with protein itself.

—H. H. Green.

Youmans, G. P., & Colwell, C. A. (1940). **The Effect of Staphylococcus Toxin on Antigen Dilution and Antibody Dilution Precipitin Titers in the Albino Rat.**—*J. infect. Dis.* **66.** 235–239.

There are indications in the literature that weakly antigenic substances such as ox lens and ragweed pollen became markedly antigenic when injected into rabbits in combination with staphylococcus toxin, and it has been suggested that the toxin acts by stimulating the antibody-forming cells. In so far as antigen dilution titres are concerned, the rat is a poor precipitin producer compared with the rabbit, but the authors decided to ascertain both the antigen and antibody dilution titres in the rat.

Egg-white, horse serum, dog serum, sheep serum, and crystalline hen-egg albumin were used as antigens. They were injected into a total of 54 rats and the same number of animals was injected with the various antigens plus staphylococcus toxin. Blood was taken 6–7 days after the last injection and precipitin tests were carried out. The results with the different

antigens varied somewhat, but it was found that staphylococcus toxin exerted no stimulating action on precipitin production when measured either by antigen or antibody dilution tests. This may be because the rat has a higher natural immunity to staphylococcus toxin than the rabbit. The results did show, however, that the antibody dilution titres, particularly in animals injected with sheep serum, were remarkably high for antisera of such apparently low potency as judged by the commonly used antigen dilution method.—JOHN FRANCIS.

I. FELIX, A. (1941). **A New Type of Typhoid and Paratyphoid Vaccine.**—*Brit. med. J.* March 15th. 391–395.

II. FELIX, A., RAINSFORD, S. G., & STOKES, E. J. (1941). **Antibody Response and Systemic Reactions after Inoculation of a New Type of T.A.B.C. Vaccine.**—*Ibid.* March 22nd. 435–440.

III. —. (1941). **Vaccination against Typhoid.**—*Ibid.* 444.

I. Vi antibody of full opsonizing and protecting power is stimulated in rabbits by intravenous injection of a typhoid vaccine killed by 75% alcohol and preserved in 25% alcohol. Subcutaneous inoculation in man induces the formation of Vi antibody in nearly 50% of cases. In contrast, the ordinary heat-killed and phenol-preserved vaccine stimulates only negligible amounts of Vi antibody. A vaccine prepared as described by F. retains its Vi-antibody-stimulating capacity for at least nine months.

II. The above results were confirmed in comparative trials in man. The alcohol-treated and preserved vaccines usually produced only a mild local reaction, and the severity of local or general reactions was not related to the degree of Vi or O antibody response.

III. It is suggested in a review of the present state of typhoid vaccination that progress is in the right direction.

[The general conclusion from these articles is that exact knowledge of the antigenic structure of an organism is necessary for evaluating the potency of a vaccine made from it, and such knowledge may suggest methods of improving the vaccine. The use of alcohol to kill organisms and preserve vaccines might prove a fruitful line of research in veterinary work.] —E. COTCHIN.

FERGUSON, L. C. (1941). **Heritable Antigens in the Erythrocytes of Cattle.**—*J. Immunol.* **40.** 213–242.

Immune sera, obtained by four intravenous injections at weekly intervals of 1 litre of citrated blood from one cow into another, mostly from daughters into their dams, were used to identify the various antigens contained in the red blood cells of cattle by haemolytic tests with absorbed and unabsorbed antisera. By this means, the existence of nine antigens in cattle r.b.c. was established. Reagents prepared from five antisera were used to test the cells of other cattle for these antigens and two pairs of antigens were found to be presumably identical. A genetical study of seven of the antigens in the r.b.c. of 104 offspring showed that each was inherited as if controlled by a single gene. Two of the antigens appeared closely related and controlled by allelomorphic genes (*i.e.* by a series of multiple alleles in which one gene produced both antigens, one produced only one, and the recessive gene produced neither). The other five antigens seemed independent of this system and of each other. F. considers that certain of these cellular antigens may be of possible value in the recognition of the parents of a calf of doubtful parentage and in the study of the inheritance of complex physiological characters such as milk yield.—R. O. MUIR.

BAILEY, G. H., & RAFFEL, S. (1941). **Organ Specificity of Tissues of the Dog and Man as Shown by Passive Anaphylaxis in Guinea Pigs.**—*J. exp. Med.* **73.** 617–628.

The use of autoclaved tissue extracts prevents, possibly by the destruction of thermolabile antigens, the numerous cross-reactions which are usually obtained in immunological tests with suspensions or extracts of unheated cells. To produce antigens for the preparation of tissue-specific antisera *Pasteurella boviseptica* was given in autoclaved organ extracts to which peptone, glucose, and NaCl had been added. The sedimented, heat-killed bacteria, to which some of the particular broth was probably adsorbed, were then injected into rabbits, and by this means antibodies for the broths as well well as for the bacteria were produced. Broth alone, even when injected in large amounts, was almost non-antigenic. Anaphylactic tests were carried out by injecting 2 ml. of the above antisera into g. pigs and then 48 hours later injecting intravenously 2 ml. of autoclaved

extracts of different organs of dog and man. Severe and fatal anaphylaxis was generally obtained with broths made from the homologous organ, and in some instances with those from heterologous organs of the same species. The most organ-specific antisera were those for striated muscle, small intestine (ileum), kidney, placenta, and fibromyoma, and the least so were those for whole blood, liver, and lung. The presence of Forssman antigen in the tissues of the dog did not interfere with the demonstration of organ specificity by the methods used in this study.—John Francis.

Boyd, W. C., & Alley, O. E. (1940). **Individual Blood Differences in Chickens.**—*J. Hered.* **31.** 135–136.

Agglutinating sera against heterologous chicken red cells were prepared in chickens; a series of agglutinin-adsorption experiments were carried out and it is believed that the five sera ultimately prepared represent the closest approach yet achieved to single specific agglutinin solutions for chicken erythrocytes.

A large number of tests were carried out with these five agglutinating sera on the blood of chickens of 19 different pedigree families. The erythrocytes of some chickens reacted with only one of the agglutinating sera, but others were agglutinated by as many as three of the sera. Sire, dam, and daughter tests in all the 19 families supported the view that individual blood differences are hereditary, but three of the daughters did have factors in their blood which were not present in either of the parents. As a possible explanation of this fact it is suggested that an agglutinogen may be recessive.—J. F.

DISEASES, GENERAL

Byrne, K. V. (1940). **Veterinary Notes on a Central Riverina District, 1935-1938.**—*Aust. Vet. J.* **16.** 122–126.

The article is a brief summary of matters of veterinary interest observed by B. during a period of four years spent as an inspector of stock in the Pastures Protection Districts of Urana and Corowa in New South Wales. These two districts cover an area of about 1½ million acres which, in normal seasons, supports approximately 1 million sheep, 20,000 cattle, and other farm stock. The western part of the area is devoted to large Merino sheep stations with a few cattle, the eastern portion being devoted to wheat and to the raising of fat lambs from British breeds and their crosses.

Among sheep, entero-toxaemia was one of the most important bacterial diseases encountered, with occasional outbreaks of blackleg, polyarthritis (in lambs) and "black disease". Parasitic diseases of sheep included trichostrongylosis, haemonchosis, and liver fluke infestation as the most important. Other internal parasites noted were *Dictyocaulus filaria*, *Monieza* spp., *Chabertia ovina*, *Trichuris ovis*, and coccidia. The most important external parasites were the biting louse (*Trichodectes sphaerocephalus*) and the sheep ked (*Melophagus ovinus*). Infestation with the foot louse (*Linognathus pedalis*) was also often noted. Other important sheep diseases referred to are pregnancy toxaemia and toxaemic jaundice.

In cattle the incidence of disease was low. TB. and actinomycosis were rare. In the few dairy herds of the district, contagious abortion and a mild form of streptococcal mastitis which readily responded to treatment, were noted. One small outbreak of anthrax in cattle occurred.

In horses, the most important condition was internal parasitism due to strongyles. Some slight infestations with *Habronema* spp. and *Gastrophilus* spp. were observed. Chorioptic mange, mainly affecting the limbs of hairy-legged horses, was sufficiently serious to justify dipping; a commercial lime-sulphur dip with about 30% sulphur was the most successful for this.—H. B. Carter.

Schaaf, J. (1940). Die wichtigeren Tierseuchen im früheren Polen. **[The Most Important Diseases in the Former State of Poland].**—*Dtsch. tierarztl. Wschr.* **48.** 540–543.

This is a brief account of various important diseases in the German-occupied area of Poland.

Rinderpest.—During the years 1920–23 there was a very comprehensive scheme of control, involving slaughter, serum treatment, and the establishment of prohibited areas. The disease has not recurred since.

Bovine contagious pleuro-pneumonia.—Epizootics occurred in 1929–30 and 1933–34, but intensive control measures with slaughter when necessary rapidly led to their control. No case has been encountered since the German occupation.

Glanders.—All horses are tested with mallein, using the intrapalpebral test and reactors are slaughtered. In 1938 there were 1,084 infected farms, but no case has been recorded since the German occupation.

Swine fever.—This disease is widespread, particularly in the east and north-east. In-contact pigs are given hyperimmune serum and are probably left to acquire an active immunity by being put with affected animals. Clinically affected animals are slaughtered; this procedure appears to have caused a very considerable reduction in the incidence of the disease.

Rabies.—This disease is common and the methods of control in use in Poland have failed completely to effect a reduction in the incidence. In 1938 there were 2,994 recorded cases in dogs and cats and 645 in other animals. The disease occurs in wild foxes and wolves, as well as in horses and cattle. The causes of the failure to control the disease are discussed. A reduction in the incidence has followed the German occupation due to the destruction of stray dogs, taxation of dog owners, insistence on notification of the disease, and an extended system of laboratory diagnosis of suspected cases.

—E. G. White.

Schoop. (1940). Die Tierseuchen im Wartheland. **[Animal Diseases in Wartheland].** —*Dtsch. tierärztl. Wschr.* **48.** 523–525.

This is a review of animal diseases in Wartheland [a new *Gau* consisting of about one-quarter of the Polish republic, adjoining the eastern frontier of Germany], as revealed since the German occupation of western Poland. Infectious diseases are more widespread than in Germany due to several factors, *viz*, the effect of the war, poor hygiene, adverse climate, and mineral deficiencies in the soil. TB. in cattle is very commonly found in abattoirs (macroscopic lesions in about 50% of cattle) and it is probable that the tuberculin test would reveal a very high incidence of infection. Infection with *Fusiformis necrophorus* is widespread and occurs as a *post partum* uterine infection in cattle, as liver necrosis, calf diphtheria, and very often as foot rot. Owing to the marshy nature of the land, fascioliasis is a very serious condition in sheep and cattle. *Bacterium coli* dysentery in calves makes calf rearing almost impossible in some districts; many farmers regularly lose 50–80% of calves.

Other diseases mentioned include swine erysipelas, fowl cholera, strangles, brucellosis, Johne's disease, blackhead, bovine redwater, "gapes" (*Syngamus trachea* infestation) in poultry, *Amidostomum anseris* infestation in geese, rabies, swine fever, and anaemia and rickets in pigs.—E. G. White.

Schoop. (1941). Akklimatisationsschäden bei Kühen, deren Kälbern und Schweinen. **[Acclimatization Losses in Cows, Calves, and Pigs].**—*Dtsch. tierärztl. Wschr.* **49.** 241–244.

In the autumn of 1940 a number of cows and pigs were introduced into Wartheland from Denmark following the German occupation of western Poland. The losses were very considerable and were due mainly to the unfavourable conditions in Poland for the imported animals, which were unable to resist the climate, poor hygiene, and deficient food supply.

Of 3,499 cows imported, 203 died or were slaughtered; 871 of 2,214 calves died or were born dead, and the losses among 3,366 pigs were 355. The losses referred to occurred within a period of less than three months. A variety of pathological conditions was responsible for the deaths, but the primary factor is considered to be failure to adapt to altered conditions of hygiene, nutrition, and climate, and the effect of the long journey. Similar losses were noted in a smaller number of animals introduced from Germany. It is considered unwise to introduce into Poland animals from other countries, but rather to concentrate on improving the indigenous stock by improved hygiene and nutrition. If stock are to be imported, this should take place in the early summer during favourable weather rather than in autumn when the severe winter has to be withstood before the process of acclimatization is complete.—E. G. White.

Piery, M., & Enselme. (1939). **Reactions of Acclimatization and of Non-Adaptation.** —*Nature, Lond.* **144.** 731–733.

The mechanisms of adaptation were studied on rabbits and geese at an altitude of about 3,500 metres over a period of six months. Observations were made on the blood, lungs, muscle, and liver of the effects of acclimatization to lowered atmospheric pressure. In the lung a congested state appears, due to the lowered pressure which seems to aggravate the anoxaemia, while in the liver and muscles, variations in the iron content seem to be in

accordance with adaptation to anoxia. Non-adaptation to lowering of atmospheric pressure, which corresponds to chronic mountain sickness of human beings, was found to be accompanied by congestion and capillarization of the lungs, by a fall in the oxygen capacity and of the total CO_2 of the blood, and by the diminution of the alkaline reserves and of the iron content of the muscles, accompanied by a light sclerosis of the myocardium. On the other hand, effective adaptation gave rise to polypnoea, unfolding of the alveoli, emphysema, increased activity of the haemopoietic centres, an increase in the oxygen capacity of the blood, the growth of certain buffer systems, and finally to an increase of iron in the liver. It is claimed that both chemical and histological observations indicate a complex response of the organism to anoxaemia, and the existence of manifold reactions of acclimatization.—R. ALLCROFT.

MACGREGOR, J. J. (1941). **Economies from Routine Veterinary Examinations of Dairy Herds.**—*Fm Econ.* **3.** 145–148. [Reprinted in *Vet. Rec.* **53.** 293–294. (1941)].

The author quotes various published statistics and estimates dealing with the financial losses in dairy herds due to disease. Estimates varied from £1–£7 per cow over the aggregate, but it was obvious that on individual farms with severe outbreaks (*e.g.* of contagious abortion and sterility) the loss per cow would be very much greater. It is surprising that such a general apathy exists towards preventive and control measures. The author discusses points brought out in the report on diseases of farm animals by the Survey Committee of the National Veterinary Medical Association of Great Britain and Ireland [*V. B.* **11.** 703].
—H. E. HARBOUR.

HÖHN, W. (1939). Wird durch die Impfung mit Rekonvaleszentenserum gegen Maul- und Klauenseuche auch Abortus Bang und Tuberkulose übertragen? [**Are Brucellosis and TB. Transmitted by Foot and Mouth Disease Convalescent Serum?**] —*Inaug. Diss., Münich.* [Translation of abst. in *Dtsch. tierärztl. Wschr.* **48.** 297].

Experiments did not reveal the frequent presence of *Brucella abortus* in the serum of cattle which had aborted during an outbreak of foot and mouth disease. Tubercle bacilli were present in 12·5% of serum samples from tuberculous cattle. A period of six days sufficed for the killing of tubercle bacilli in carbolized and formolized convalescent serum. As the testing of convalescent serum for bacterial contamination lasts for five or six days, it is assured that such serum is incapable of transmitting brucellosis or TB.

It is therefore advised that convalescent serum should not be used immediately after collection, but only after five or six days' conservation.

SCHOFIELD, F. W. (1939). **Further Studies in Bovine Hemoglobinuria (Red Water).** —*Rep. Ont. vet. Coll. 1938.* pp. 35–39.

In Ontario, the incidence of bovine haemoglobinuria is almost always associated with heavy feeding of kale, rape, turnips, or turnip tops. In some parts of the province the disease has occurred when the cattle were first turned out to grass in the spring.

Ca, P, and Hb determinations were made on four herds of dairy cows which included 20 affected animals, data for 16 of which are given No variation was found from the normal Ca values, but the P values varied from day to day and in some cases were very low, although cows which showed no signs of haemoglobinuria also had low blood P values, and some which were affected had normal values. Hb values varied from 30–100% in affected animals. Mild and transient haemoglobinuria occurred in one of three experimental cows fed exclusively on rape for two weeks, but no marked fall occurred in blood P. MADSEN & NIELSEN [*V. B.* **10.** 695.] also reported low blood P values in cases of haemoglobinuria. The relationship, if any, between haemoglobinuria and low blood P is not known.—J. A. GRIFFITHS.

BEIJERS, J. A. (1939). Puerperale haemoglobinurie bij het rund. [**Puerperal Haemoglobinuria in Cattle**].—*Tijdschr. Diergeneesk.* **66.** 811–822.

This disease of cattle occurring in the summer months in Holland was described by WESTER and BEIJERS in 1923 as post-parturient anaemia, haemoglobinuria not then being regarded as a typical symptom. In the present paper nine case records are given of the disease, which B. considers is best referred to as a haemolytic anaemia.

It affects cows a few weeks after normal parturition. They sicken suddenly showing

anorexia, drop in milk yield, slight fever, weak and rapid pulse, marked paleness of unpigmented parts of the body, particularly of the udder and visible mucosae, and haemoglobinuria of short duration. The blood picture is changed as in haemolytic anaemia. A great fall in r.b.c. was noted, and in some cases the count was as low as one million; leucocytosis was also observed. Many immature blood cells were frequently present. The serum may contain both bilirubin and methaemoglobin. The mortality was not high and treatment by blood transfusion or intravenous saline injections up to 5 litres was often successful. Copper, iron, and arsenic may be useful together with good food. Death occurs from the effects of acute anaemia.

The cause of the disease is unknown. In Holland it seems to differ from that in Sweden as described by HJÄRRE: the latter affected badly fed stall-confined cows, whilst in Holland it affects cows on good summer pasture.—L. T.

JENNINGS, W. E. (1941). **Some Common Problems in Horse Breeding.**—*Cornell Vet.* **31.** 197–216.

The detailed breeding records over a five-year period in one of the U.S. Army studs are presented and discussed. They show that the common practice of breeding foaling mares on the ninth day after parturition is inadvisable. J. recommends that no mare should be bred on the ninth day if any of the following conditions occur:–(a) the placenta weighs over 14 lb.; (b) the placenta is retained for more than three hours; (c) the mare needs assistance at foaling or the foal is weak, dead at birth, or dies shortly after birth; (d) there is abnormal vaginal discharge; or (e) there is evidence of infection in the genital tract. J. deals with the treatment of barren mares and recommends vaccination of all pregnant mares against equine infectious abortion (*Salmonella abortus-equi* infection). Advice is given on the general care and management of brood mares and stallions. A number of records are given for individual mares and stallions, which illustrate various problems connected with horse breeding.

—N. J. SCORGIE.

STOICESCU, G. (1939). Tifotoxianaemia infectioasă a calului din Basarabia. [**Acute Infectious Disease of Horses in Bessarabia**].—*Rev. vet. milit. Bucarest.* **10.** 7–14.

S. describes an epizootic disease affecting some hundreds of horses in Bessarabia which occurred in 1938. It was manifested in several forms described, according to the varying symptoms, as the typhoid form, the typho-anaemic form, the toxi-oedemic form, and the abdominal form.

The cause was not discovered; the disease was believed to be contagious. A strain of *Bacterium equirulis* isolated from the affected animals did not reproduce the disease. No filtrable virus could be demonstrated as the cause.

The severity of the disease appeared to be directly related to the degree of helminth infestation which affected the animal.—M. W.

STEVENSON, J. C. (1940). **Disease Control in a Modern Goat Dairy.**—*Lederle vet. Bull.* **9.** 143–147.

A description is given of the buildings and routine in a goat dairy in Westbury, N.Y.; in all essentials it is comparable with a modern cow dairy in miniature. The most important disease of milch goats is staphylococcal mastitis. This usually runs a chronic course punctuated with mild flare-ups. Streptococcal infection is less frequent, but when it does occur the course is extremely rapid; the udder becomes gangrenous and death results within 24 hours of the onset of symptoms. Sulphanilamide has proved useless for treatment. Other diseases of importance are *Brucella abortus* infection, TB., staphylococcal abscesses of the parotid gland and of the submaxillary and precural lymph nodes and elsewhere, and parasitic infections. "Pregnancy disease" occurs commonly during the winter and normally causes a 2% mortality. Two clinical forms are encountered: the first, a fatal form, makes its appearance a few days before kidding; the second, a benign form, is noticed sometime during the last month of pregnancy.—N. J. SCORGIE.

HEIDEMANN, J. (1938). Pathologische Erscheinungen am Schweineuterus und ihre Bedeutung für die Fleischbeschau. [**Diseases of the Uterus in Swine and their Importance in Meat Inspection**]. —*Inaug. Diss., Leipzig.* pp. 39.

This is chiefly a review of the literature on diseases of the female genital tract in pigs. H. examined the genitalia of 644 virgin gilts and of 406 sows at Dresden abattoir and found malformations or diseases in seven of the former

and five of the latter. The descriptions of these conditions are so intermixed with the main review that it is possible to detect what they are in only nine cases, *viz*, one unicorn uterus, two atresic uteri (one horn shortened), one cystic endometritis, one pyometra, and four cases of retained foetus. The meat-inspection aspect is discussed.—J. E.

COHRS, P. (1940). Veränderungen der Skelettmuskulatur beim plötzlichen Herztod der Schweine. **[Changes in the Skeletal Musculature in Sudden Fatal Syncope in Swine].**—*Dtsch. tierärztl. Wschr.* **48.** 292–294.

From P.M. observations on pigs dead of this disease of unknown aetiology, C. noticed that, whilst the heart was the predilection site some years ago, in more recent times the gross lesions have been situated in the muscles of the trunk and hind quarters and the heart has been involved to a less extent.

The initial change in the skeletal musculature takes the form of slight pale streaks due to localized anaemia. The intermediate stage is manifested by beginning hyaline or waxy degeneration, in which muscle fibres begin to lose their normal striation. The final stage is that of hyaline degeneration, which gives the muscle the macroscopic appearance of fish flesh and the histological appearance of gross loss of muscle-fibre tissue, often with a persistent empty sarcolemma.

This muscle lesion resembles that of paralytic myoglobinuria of the horse.—J. E.

DUDLEY, F. J., DOBSON, N., & GORDON, R. F. (1941). **Mortality in Egg-Laying Trials During the Period 1929-1937.**—*Vet. Rec.* **53.** 323–330.

This survey of the mortality among birds in 15 county egg-laying trials in England and Wales is an abbreviation of a report submitted to the Poultry Technical Committee in 1938, and similar data for one large open trial are given for comparison. Over 80% of all birds which died were examined at the Veterinary Laboratory at Weybridge. It is shown that mortality gradually increased from 6·24% in 1929 to 17·24% in 1936–37. The highest mortality occurred among White Leghorns.

One table classifies the various causes of death at the county trials under 20 separate headings and another gives a similar summary for the open trial. All the diseases tabulated are discussed. The varying incidence of peritonitis of the reproductive system (70% of all cases during the last half of the trial period) may have been due to faulty handling and trap-nesting, and there was evidence that it was primarily due to degeneration of the ovary usually associated with " carriers " of pullorum disease. Among affections of the digestive system, worm infestations by *Davainea* spp. and *Ascaridia galli* are shown to be greatly on the increase.

The incidence of respiratory diseases varied considerably (1·4–10%) from year to year, and outbreaks of contagious catarrh largely account for the high figures during 1931–33. There was an increase of visceral gout and other urinary diseases from 2·1–8·4% in 1935–36 with a slight drop to 6·8% in 1936–37. Diseases of the liver declined from one-fifth of the deaths in the first year, to only about one-twentieth in 1936–37. Lymphomatosis and tumour formation are grouped together. True fowl paralysis (one case) was first diagnosed in 1931–32. It increased each year up to 1936–37 (13%) except in the Light Sussex breed. During 1937–39 a detailed survey of the incidence of neuro-lymphomatosis in all its forms revealed 28–30% of fowls examined to be affected, and it was the chief cause of deaths in laying trials. Fowl leucaemia caused an average mortality of 7·5% during 1931–37, except during 1932–33 (4·6%).

Of specific diseases, coccidiosis never caused more than 0·62% of deaths among birds in the trials, but this figure cannot be compared to mortality rates on general farms. Tuberculosis is shown to have declined from 4·1% in birds examined in 1929–30 to 2·3% in 1934–35 and to have increased again to 5·2% in 1936–37. [It is regrettable that any birds so diseased or with pullorum disease should have been sent to these trials.] Other diseases mentioned include fowl pox, vent gleet, fowl cholera, fowl typhoid, and infectious laryngotracheitis, and none of these caused greater than 0·3% mortality in any year.

For comparison, the figures of mortality at some laying trials in the U.S.A are tabulated; these show that the peak period of losses in 1927–28 (30·86%) and 1929–30 (31·1%) has not been followed by any marked improvement.

—C. V. WATKINS.

STEVENSON, L. (1939). **Food Poisoning in Foxes and Mink.**—*Rep. Ont. vet. Coll.*

1938. pp. 45–49.

Food poisoning caused 62% mortality among 100 foxes and mink examined P.M. at the college laboratory. There is a general discussion of the several ways in which food poisoning can occur.—J. A. GRIFFITHS.

POPESCU, F. (1939). Cercetări asupra vaccinării in pasteurela aviară si a seroterapiei antiholerice concomitente cu vaccinarea în diftero-epitelioma contagioasă. **[Simultaneous Vaccination and Serum Therapy against Fowl Cholera and Fowl Pox].**—*Arhiva vet.* **31.** No. 6. 21–32. [French and German summaries].

The history of simultaneous vaccination is discussed, and P. describes his own work on poultry. In flocks attacked by fowl cholera and fowl pox he vaccinated simultaneously against the two diseases. The results were good. The spread of cholera was stopped and new cases of pox were mild. Serum therapy of fowl cholera was also carried out simultaneously with vaccination against fowl pox and results were good. The degree of immunity produced by these methods was high, treated birds being under observation for two years.—M. WATSON.

WICKWARE, A. B. (1941). **Notes on Miscellaneous Diseases of Geese.**—*Canad. J. comp. Med.* **5.** 21–24.

Several cases of parasitic and bacterial infection as observed in wild and domesticated geese are briefly described. Renal coccidiosis is recorded for the first time in geese in Canada.

I. FOURIE, P. J. J., & ROETS, G. C. S. (1939). **Quantitative Studies upon Porphyrin Excretion in Bovine Congenital Porphyrinuria (Pink Tooth). No. 2.**—*Onderstepoort J. vet. Sci.* **13.** 369–382. [For part I, see *V. B.* **9.** 640].

II. FOURIE, P. J. J. (1939). **Bovine Congenital Porphyrinuria (Pink Tooth) Inherited as a Recessive Character.**—*Ibid.* 383–398.

I. This paper records the results obtained in measuring the quantitative porphyrin excretion during different times of the year of bovines with congenital porphyrinuria and comparing it with that of normal cattle. In two cases porphyrin was found to be excreted in larger amounts during the late summer than in the early spring. This increase was not associated with an increased amount of urine or faeces. The ratio of coproporphyrin I to coproporphyrin III varied from animal to animal. When quantitative porphyrin determinations were made over periods of 10–14 days, it was found that the ratio of total porphyrin : coproporphyrin : uroporphyrin (*e.g.* 10 : 8 : 2) was approximately constant except in one case, where for one period abnormal quantities of urine were excreted.

II. In detailing the histories of the cases of "pink tooth" with which he had come into contact in South Africa, and as a result of his own breeding experiments, F. concludes that the condition is inherited as a recessive character. Inbreeding experiments produced several cases, but F. had not been able to obtain an affected bull to mate with affected females when, if the character is recessive, all the progeny should show the disease.—E. M. R.

EHRENBERG, P. (1939). Zur Sandaufnahme durch Pferde. **[The Ingestion of Sand by Horses].**—*Züchtungskunde.* **14.** 142–149. [Abst. from abst. in *Tierärztl. Rdsch.* **45.** 704].

The question of the possible harmful effects of the ingestion of sand by horses is discussed, as it is stated that an increased use of root crops for horses is liable to result in an appreciable sand intake. An examination of rye straw, oats, and steamed potatoes showed them to contain 1·7%, 1·2%, and 0·2% sand respectively. Observations on horses fed on hay, oats, or potatoes resulted in the calculation that they had ingested from 2–56 g. sand daily. It is argued that such ingested sand cannot fail to be harmful.

An analysis of pasture grass showed a sand content of 3·8% of the dry matter.—J. E.

—. (1939). **Report on the Histopathology in Stiff Lamb Disease.**—*Rep. Ont. vet. Coll. 1938.* p. 40.

In the muscles there is degeneration and fracture of the fibres with calcareous infiltration of the fragments. This is shown in a photomicrograph of a lesion. Cellular infiltration is not excessive, but both polymorphonuclear and round cells are present. No haemorrhage is seen in the muscle. In the liver small clusters of 10–20 polymorphonuclear cells are scattered through the tissue, an average of one cluster in each lobule; only slight damage occurs to the parenchyma. The thyroid is enlarged and sections show definite hyperplasia of the

secretory epithelium. In the final stages there is cellularity of the affected muscular tissues, due to proliferation of the fibroblasts and multiplication of the nuclei in the sarcolemma; several nuclei may be seen in a single sarcolemma. There is moderate cellular infiltration and numerous portions of damaged muscle remain in the cellular mass.—J. A. GRIFFITHS.

SCHOFIELD, F. W. (1939). **A Case of Scrapie in an Imported Ewe.**—*Rep. Ont. vet. Coll. 1938.* pp. 34–35.

A description is given of the history, symptoms, P.M. findings, and histopathology of what is believed to be the first case of scrapie to be reported in America.—J. A. GRIFFITHS.

PETERSEN, W. W. (1939). De forskellige Former af Hermaphrodisme hos Svinet. [**Types of Hermaphroditism in Swine**]. —*Maanedsskr. Dyrlaeg.* **51.** 96–103.

This is a review without case record numerical data on P.'s experience of hemaphroditism in slaughter swine. The condition appears to have become common in Denmark in the last 20 years and P. has seen about 500 cases. All kinds of hermaphroditism have been seen, *viz*, genuine hermaphroditism, bilateral, unilateral, and alternating, and pseudohermaphroditism, feminine and masculine, each of the latter divisible into three forms, external, internal, and complete.

Examples of such cases and of variations observed are described.—J. E.

PANU, A., MIHAILESCO, M., & ADAMESTEANU, I. (1939). Hypoplasie cérébelleuse et pachygyrie chez la chatte. [**Cerebellar Hypoplasia and Pachygyria in a Cat**]. —*Arhiva vet.* **31.** No. 1–2. 18–27. [In French].

The authors report a case of cerebellar ataxia in a kitten which at autopsy proved to have cerebellar hypoplasia and pachygyria of the cerebrum. The kitten was one of a litter of four and had been unable to walk. It cried continuously and could only be fed with difficulty. Clinical examination revealed no abnormality of vital functions. The kitten could not get on its feet and when lying down used its legs in an incoordinated manner. When food was placed before it on its straw bed the kitten did not distinguish between food and straw but devoured both. On rising on its fore feet the animal fell over on its back, and when it rose on its hind legs it fell forward on its head.

On P.M. examination the cerebellum was found to be much underdeveloped, being less than half the normal size. The cerebral convolutions were much thickened and secondary convolutions were absent. A small cyst was situated on the median line of the vermis and the fourth ventricle was not covered.

Histologically, the middle and posterior cerebellar peduncles were absent, only the anterior one being distinguishable. The cellular structure was abnormal, the three zones showing no separation. The thickness of the various zones was abnormal and the Purkinje cells were irregular in size and location. Histologically the cerebral hemispheres were normal in structure.—MILLER WATSON.

—. (1941). **Tentative Pathologic Nomenclature for the Disease and or the Disease Complex Variously Designated as Fowl Leucemia, Fowl Leucosis, Range Paralysis, Iritis, Lymphomatosis, Lymphocytoma, Neurolymphomatosis, Leucotic Tumors, Leucemoid Diseases, etc.**—*Amer. J. vet. Res.* **2.** 116.

The following suggestion for classification is made by the group of research workers at the U.S. Regional Poultry Research Laboratory at East Lansing, Michigan. Avian leucosis complex :– (1) lymphomatosis—neural, visceral, ocular, or osteopetrotic; (2) leucosis—erythroblastic or granuloblastic.

" It is understood that the various forms may be characterized by aleucaemic, subleucaemic or leucaemic blood pictures and should be further classified on this basis ".—J. E.

BROWN, J. C., & CROSS, J. C. (1941). **A Probable Agent for the Transmission of Fowl Paralysis.**—*Science.* **93.** 528.

The work recorded was carried out on premises on which F.P. had reached serious dimensions, causing 61 deaths in 225 birds in 1937, 92 deaths in 345 birds in 1938, and 403 deaths in 439 birds in 1939.

The following results are recorded :– 12 healthy birds placed with 36 paralysed birds in pens infested with *Argas persicus* developed F.P. in 31 days; 36 healthy birds placed in disinfected pens remained healthy at the end of 31 days; all of 120 healthy birds placed in infested pens developed paralysis; only one of 126 healthy birds placed in clean pens developed paralysis; five birds inoculated with a suspension prepared from ticks removed from paralysed birds became affected with

paralysis. Intensive work was carried out to prevent the recurrence of the ticks, and only five cases of F.P. have since occurred on the premises.—W. J. Ironside.

Wagener, K., & Matzke, M. (1939). Uebertragbarkeit der Geflügellähme. **[Transmissibility of Fowl Paralysis].**—*Tierärztl. Rdsch.* **45.** 555–559 and 578–581.

The authors carried out experiments on 340 chickens, including White Leghorns as well as non-pedigree stock, arranging them in 11 groups, some of which were untreated controls, some composed of birds which were given an intra-abdominal injection of affected nerve tissue from natural cases of fowl paralysis, and some comprised of birds which were placed in contact with the latter. The experimental conditions regarding choice of birds, management, and feeding were carefully arranged to obtain results as clear-cut as possible.

Of the Leghorns, 25% of the appropriate group contracted fowl paralysis by injection and a further 35% showed latent signs of it, whilst the control and contact groups each had an 8% incidence. Of the non-pedigree birds more than 70% died from intercurrent infections and none of them died of fowl paralysis although a small proportion of the survivors of all three groupings showed signs of latent fowl paralysis.

In judging the results it was considered that the disease had been transmitted both by injection and by contact, though not in so clear-cut a way that an infective agent could be incriminated. The virtual impossibility of securing birds definitely free from the seeds of fowl paralysis is stressed.—J. E.

Schwirzke. (1939). Zur Frage der Vererbbarkeit der Rinderleukose. **[Heredity of Cattle Leucosis].**—*Berl. Münch. tierärztl. Wschr.* Sept. 15th. 575.

In support of the contention that cattle leucosis is related to an hereditary factor, an instance is recorded of a calf which on slaughter at four weeks old was proved to have advanced leucosis and which was the progeny of a cow the history of whose other calves was as follows:—two had been born dead, another had been found dead at eight months old without having previously shown signs of illness, another had been sold to a butcher at four months old, and a sixth had been similarly disposed of at five years old [state of health of the last two animals not revealed]. This evidence indicates that the cow tended to produce calves not healthy enough to rear to maturity. It is suggested that all may have been affected with leucosis.

—G. Williamson.

MacDowell, E. C., Potter, J. S., & Taylor, M. J. (1939). **The Influence of Transplantation upon Immunological Properties of Leukemic Cells.**—*Proc. nat. Acad. Sci.* **25.** 416–420.

Mice of a strain in which spontaneous leucaemia constantly occurred in nearly 90% of the animals were given repeated graded doses of highly virulent cells from a frequently transplanted leucaemia which was originally spontaneous in the same strain of mice. The injections were given intraperitoneally at monthly intervals and the dose increased until it exceeded the normal lethal dose. The immunizing treatment was without effect on the incidence of spontaneous leucaemia which remained at 85%. Mice of the same strain similarly injected with normal mouse tissue showed a similar incidence of spontaneous leucaemia.

Contrary to the usually accepted view this failure to immunize the mouse to spontaneous tumours is not due to a unique relationship between the host and its own cells, since leucaemic cells from a fresh spontaneous case will rapidly kill non-immunized and immunized mice alike. It is suggested that as a result of repeated transplantation the leucaemic cells develop new immunological properties and require entirely different immunities to resist them. According to this hypothesis, induction of resistance to spontaneous tumours is not necessarily impossible.—E. G. White.

Holmes, E. (1939). **The Effect of Toxaemia on Metabolism.**—*Physiol. Rev.* **19.** 439–471.

Abundant evidence is cited from the literature to show that in toxaemia, whether occurring in human cases or produced experimentally in animals, there is a more or less severe disturbance of the normal metabolism of carbohydrate. There is a considerable body of opinion which refers some of the important metabolic changes occurring in toxaemia to lesions of the adrenal cortex, but H. does not consider that this is the most important cause of the metabolic disturbances. From a consideration of the evidence it is highly probable that toxaemia may act primarily upon the endocrine glands,

although tissues such as the liver, kidneys, brain and skeletal muscles which carry on the actual work of metabolism are often damaged to such an extent in cases of toxaemia that the lesions can be detected both by histological and biochemical methods.

Most of the work reviewed is concerned with the effects of diphtheria toxin in human cases and in animals, but it is shown that there is a definite parallelism between the changes in carbohydrate metabolism brought about by diphtheria toxaemia and by poisoning by carbon tetrachloride, chloroform, phosphorus, organic arsenicals, guanidine, and apparently in some cases by the toxaemia of eclampsia. The common features are liver damage, decreased glucose tolerance, low liver glycogen, hypoglycaemia, and inability to remove lactic acid from the bloodstream; these changes may all reflect a diminished power of gluconeogenesis. But it is pointed out that since proteins, fats, and carbohydrates are all broken down to three and four carbon atom compounds, the sources of which are indistinguishable at this stage, it may be misleading to distinguish the effect of toxaemia on the metabolism of carbohydrate as distinct from that on protein or fat.

It is concluded that advances in knowledge of pathological conditions must always depend ultimately on clinical observation and study, and it is suggested that a great deal more use could be made of veterinary material than is at present the case.—R. Allcroft.

Letonoff, T. V., Reinhold, J. G., Riggs, H. E., & Cohn, C. (1940). **Lead Mobilization Accompanying Toxemia of Pregnancy.**—*Amer. J. Obstet. Gynaec.* **40.** 1017–1021.

Estimations of the lead content of blood and urine were made on 18 human patients with a clinical diagnosis of pregnancy toxaemia; these included 12 cases of pre-eclampsia, one case of eclampsia, three cases of nephritic toxaemia and two of essential hypertension. The mean concentration of Pb in whole blood was 0·053 mg. per 100 c.c., the extreme range being 0·001–0·115 mg.%. In a control group of 15 normal pregnant women the average blood Pb concentration was 0·031 mg.%, with an extreme range of 0·011–0·077 mg.%. Values of 0·060 mg.% or higher, which occurred in eight toxaemic patients, were considered indicative of excessive absorption or of Pb mobilization. Excretion of Pb in the urine was estimated in three cases and found to exceed the normal limits in every case. No evidence of unusual exposure to Pb was found, and this suggests that the increased blood Pb is from stores accumulated through casual daily contact and activated by metabolic disturbances occurring during the pregnancy toxaemia; the combined effects of decalcification and acidosis in particular may aid the mobilization of Pb. Although the significance of Pb in the toxaemia syndrome is not clear, it is pointed out that many of the symptoms characteristic of this condition, *viz*, hypertension, convulsions, headache, renal changes, and visual disturbances, are also prominent manifestations of Pb poisoning.—R. Allcroft.

Hirsch, A. (1941). **Relation of the Chemical Composition of Lipids to Characteristic Tissue Lesions.**—*Arch. Path.* **31.** 516–527.

A review of available information concerning the relation of the chemical composition of the lipoids to characteristic lesions in the tissues, discloses that the fatty acids and neutral fats are both important. The reaction of a tissue to unhydrolysed fat is similar to that to an inert oil like liquid paraffin. Various factors are concerned with hydrolysis of fats and liberation of fatty acids in the tissues, including (a) acidity, (b) physical state of the fatty acids, (c) nature of soaps or esters formed (*e.g.* cholesterol), and (d) chemical nature of the fatty acids. The pathological effects resulting from these factors are discussed in detail. The cholesterol esters of the fatty acids are significant in systemic disorders of lipoid metabolism such as occur in Schuller-Christian disease and xanthomatosis, and also in xanthoma and atherosclerosis. Cholesterol and its esters are always in excess in such lesions, but the lipoid deposits contain other fatty substances also.

The lipoid deposits in Niemann-Pick disease and Gaucher disease are also mixtures; in the former there is a high phosphatide content (mainly sphingomyelin) and in the latter a high cerebroside content (mainly kerasin).—F. A.

I. Somogyi, M., & Kirstein, M. B. (1940). **Changes in Blood Ketone Acids during Artificial Fever.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 640–644.

II. Somogyi, M. (1940). **Changes in Ketonemia and Ketonuria during Hypoglycemia.**—*Ibid.* 644–647.

I. Artificial hyperthermia in man was accompanied by an increase in the blood ketone content, apparently due to increased rate of ketogenesis in the liver. It is suggested that an increased rate of hepatic glycogenolysis is sufficient to increase ketosis. The increase of blood ketone content in artificial hyperthermia can be prevented by the continuous injection of glucose sufficient to maintain hyperglycaemic levels throughout, a condition which favours the deposition of glycogen in the liver while simultaneously preventing an increase in the rate of glycogenolysis.

II. Hypoglycaemia, either induced or occurring naturally (possibly due to hyperinsulinism) is frequently accompanied by ketonaemia and ketonuria. The increased rates of formation of ketone acids, occurring in the liver, are coincident with increased rates of hepatic glycogenolysis.—ALFRED EDEN.

JÁRMAI, K., & KEMÉNY, A. (1941). Melanosis coli beim Pferd. **[Melanosis coli in the Horse].**—*Dtsch. tierärztl. Wschr.* **49.** 81–83.

Melanosis coli is recognized in human pathology but this is believed to be the first record of the condition in the horse. A ten-year-old gelding died as a result of intestinal tympany and showed at necropsy areas of mucosa in the caecum and large colon which were dark brown in colour and either diffusely pigmented or with a striated appearance. The pigment was distributed as a fine network which was not, however, related to the blood or lymph vessels. Histological sections showed the pigment to be intra- and extra-cellular and situated in both the mucosa and submucosa. The cells containing pigment were rounded, oval, or fusiform and the epithelium was free from pigment.

The reactions for iron and lipoids were negative, and silver nitrate was not reduced; the pigment gave a positive "dopa" reaction and was bleached by hydrogen peroxide. The authors consider the pigment to be allied to melanin and similar to that found in the condition in man.

The horse had for several years belonged to a brewery and it is suggested that the ingestion of large amounts of malted barley and other by-products may have facilitated the production in the intestine of a melanin-like pigment which was absorbed and stored in connective tissue cells.—E. G. WHITE.

BURROWS, H. (1940). **Spontaneous Uterine and Mammary Tumours in the Rabbit.**—*J. Path. Bact.* **51.** 385–390.

Among 25 normal female rabbits which died after being under observation for more than 900 days, primary uterine tumours (adenocarcinomas) were found in 15, and three of these also had tumours of the mammary gland (papillomas). Of the 25, 15 had been treated in various ways with 1 : 2 : 5 : 6-dibenzanthracene and 10 (66%) of these had tumours. Five (50%) of the remaining ten untreated animals had uterine tumours. It seems, therefore, that the carcinogenic activity of dibenzanthracene is low in rabbits. The rabbits under study were not inbred.

B. points out that several features suggest that ovarian hormones may have an influence in causing these tumours, *viz*, the associated changes in the mammary glands, the endometrium, the ovaries, and the adrenal glands. Against this supposition it must be noted that apart from the rabbit, uterine and mammary tumours are rarely associated in the same individual. An added complication which must be borne in mind is that most of the rabbits were repeatedly pseudo-pregnant, a condition which occurs rarely in other species. —J. S. PATERSON.

LIPSCHÜTZ, A. (1941). **Spontaneous Fibromyoma in the Female Guinea Pig.**—*Arch. Path.* **31.** 702–705. [Author's summary copied *verbatim*].

Spontaneous uterine or extrauterine fibroid and fibromyoma are extremely rare in the guinea pig. One small pedunculated uterine fibromyoma was found in a group of 94 untreated, noncastrated adult females. Its microscopic structure was similar to that of fibromyoma in woman and different from that of experimental fibroid in the guinea pig. In another untreated female intramural nodules of hyperplastic muscle fibers were discovered in the uterus during microscopic examination.

GUSBERG, S. B., ZAMECNIK, P., & AUB, J. C. (1941). **The Distribution of Injected Organic Diselenides in Tissues of Tumour-Bearing Animals.**—*J. Pharmacol.* **71.** 239–245.

Mice inoculated with sarcoma 180 were intravenously injected for 15 days with Se as diselenide acetic acid and diselenide-*n*-butyric acid and the distribution of the element in the

tissues was determined. The lungs were found to contain the highest concentration of Se, but following the use of similar compounds to which Hg had been added the highest concentration was found in the kidneys. This addition of Hg appeared to influence the excretion of Se, and mice injected with such compounds showed a heavier deposition of Se throughout the tissues. From the chemotherapeutic aspect, these forms of Se, or the form as found in toxic wheat, had no inhibiting effect upon the growth of the sarcoma, and analysis of the tissues of such animals showed that relatively very little of the Se was concentrated in the tumours.—Alfred Eden.

Fischer, R. (1937). Das Krebswachstum in der Parabiose. **[Cancer Growth in Parabiosis].**—*Dtsch. Z. Chir.* **249.** 616–631. [Abst. in *Amer. J. Cancer.* **35.** 579, copied *verbatim*. Signed: Seaton Sailer].

Parabiosis was effected surgically in mice by joining both peritoneal cavities through a shoulder to hip incision and uniting the wound edges layer by layer. Twelve pairs of female mice were thus studied, an animal bearing a spontaneous tumor being in each instance united with a healthy animal, in order to determine the influence of the presence of the healthy animal on the partner's tumor growth. Five pairs did not survive over one week postoperatively. In the remaining 7 pairs there appeared to be an acceleration rather than a retardation of the tumor growth and a complete lack of any benefit to the carcinoma-bearing animal. In one pair the healthy animal developed a tumour in the genital region that had every appearance of metastasis. A long bibliography is appended.

NUTRITION IN RELATION TO DISEASE

Dunlop, G., & McCallien, W. J. (1941). **Influence of Geology on the Health of Grazing Animals.**—*Nature, Lond.* **147.** 615–617.

The paper deals with the wasting disease of sheep in Ayrshire long known under the name of "vinquish" and analogous to the "pining" of other parts of Scotland; it shows certain affinities to "coast disease" of Australia, "bush-sickness" of New Zealand, and "salt sickness" of Florida. The authors regard "vinquish" as a simple cobalt deficiency preventable and curable by administration of traces of cobalt.

In investigating the geological features of the district a sharp localization of the disease was determined, corresponding to the position of the Southern Uplands Fault, sheep to the north of it being alone affected. Here the rock is Old Red Sandstone with andesitic lavas, felsite, and related intrusions. A morainic drift from the south also seems to be implicated in the composition of the iron- and cobalt-deficient soil in the "vinquish" areas.—J. E.

Peacock, M. S. (1939). **Minor Elements: Collected Bibliographical Data on the Amounts of the 29 Principal Minor Elements in Animal Organs (Land Mammals and Birds).** pp. 110. Bracknell: Imperial Chemical Industries, Ltd., Jealott's Hill Research Station. [fcp] [Mimeographed].

Data collected from the literature show the order of magnitude of the amounts of minor elements in organs of land mammals and birds. The elements dealt with are:– aluminium, arsenic, barium, boron, bromine, calcium, chlorine, chromium, cobalt, copper, fluorine, iodine, iron, lead, magnesium, manganese, mercury, nickel, phosphorus (not comprehensive), silica, silver, sodium, strontium, sulphur, tin, titanium, vanadium, and zinc. A list of references is appended giving the source from which the data were derived.—R. A.

Malan, A. I., du Toit, P. J., & Groenewald, J. W. (1940). **Iodine in the Nutrition of Sheep. Final Report.**—*Onderstepoort J. vet. Sci.* **14.** 329–334.

As in previous experiments [see *V. B.* **9.** 267.] the authors showed that small supplements of potassium iodide were not beneficial to sheep. Two groups of ten Merino ewes were fed the same basal ration adequate in all known respects; each sheep of one group received in addition 0·05 g. daily of KI. A slight depression in weight and some reproductive irregularity occurred, but not to the same extent as in the previous experiments. The indiscriminate use of iodine supplements for sheep is not recommended.—E. M. Robinson.

TUCKER, H. F., TREADWELL, C. R., & ECKSTEIN, H. C. (1940). **The Effect of Supplementary Cystine and Methionine on the Production of Fatty Livers by Rats on High Fat Diets containing Casein or Edestin.**—*J. biol. Chem.* **135.** 85–90.

In studies on the mechanism involved in the production of fatty livers, rats were fed on diets of 40% fat and 5–20% protein (casein or edestin) with supplementary methionine and cystine. It was shown that the level of fat in the livers of the rats was related to the total methionine and cystine content of the diets, the lipotropic action of the proteins being explained by their methionine and cystine content.—F. AYLWARD.

KELLERMAN, J. H. (1939). **Change in Body Weight and Food Consumption of Rats on Repeated Feeding of a Deficiency Diet.**—*Onderstepoort J. vet. Sci.* **13.** 201–216.

The experiments described were undertaken to confirm or disprove observations made by FRENCH & BLOOMFIELD (1937) that rats which had lost weight on a defective diet, would, when restored to normal, lose weight more rapidly when again placed on the defective diet.

K. found that his rats did not lose weight more rapidly when again placed on the defective diet; the loss of weight was, in fact, less rapid. The food intake did not differ appreciably during successive periods on the same defective diet.

It is suggested that in the first experiments the animals consumed less food in the second trial on the defective diet, possibly due to the palatability in the second period being inferior.
—E. M. ROBINSON.

VOGELSANG, E. G., & GALLO, P. (1939). Cara hinchada u "osteoporosis" de los equinos en Venezuela. [**Osteodystrophia of Equines in Venezuela**].—*Rev. Med. vet. Parasit., Caracas.* **1.** 21–33.

The authors report a number of cases of osteodystrophia in riding horses and Shetland ponies. Incoordination of movements, inappetence, debility, and emaciation were observed. Examination of the faeces revealed the presence of sclerostomes which were eliminated by anthelmintic treatment [no details given]. At autopsy the bones of the head were found to be very thin in some cases, and in one case they were enlarged and porous. From this evidence it is concluded that the condition was osteoporosis.—MILLER WATSON.

LINDBLOM, K. (1939). **Early Roentgen Signs in Rickets.**—*Acta paediatr., Stockh.* **25.** 170–180. [In English]. [Author's summary copied *verbatim*].

The classical roentgenologic picture of rickets is always preceded by roentgenologically observable changes, which are capable of being influenced by antirachitic treatment and which are interpreted as rachitic.

The early changes are :– General decalcification, decreased density of the calcification zone, and metaphyseal sclerosis. They occur most often in conjunction, and are complementary to each other. The ribs are not suitable for the early roentgen diagnosis of rickets.

These roentgenologic changes can always be seen earlier than the usual clinical ones, with the common exception of craniotabes.

During the first weeks of life a metaphyseal decalcification occurs which, at least for the present, is not considered a rachitic sign.

DIERNHOFER, K. (1940). Richtlinien und praktische Beispiele für die zeitgemässe Bekämpfung der Rhachitis und Knochenerweichung. [**Directions and Practical Instances for Modern Control of Rickets and Osteomalacia**].—*Wien. tierärztl. Mschr.* **27.** 225–234 and 241–250.

A general article considering the various factors involved in proper skeletal development of stock (pigs and cattle), such as "natural foods", exercise, light, and mineral and vitamin content of ration. It is pointed out that use of vitamin D preparations is misguided unless the mineral content of the total ration is properly adjusted. The common foodstuffs from which rations are made up are considered in relation to average content of CaO, MgO, and P_2O_5, and the method of adjusting to correct mineral content with calcium carbonate, or phosphate, or phosphorus-rich foods such as bran, is explained. The calculations used are based on conventional accepted mineral requirements, the method of "balancing" being that of IBELE, MAREK and others, *i.e.* calculation of E.A., or the difference between CaO + MgO and P_2O_5 expressed as milligram equivalents per 100 g. of dry matter [see also *V.B.* **1.** 261]. This method is preferred to indiscriminate use of commercial mineral supplements.

In clinical cases of osteodystrophic disorder, injections of vigantol [synthetic vitamin D] may speed recovery after rectification of mineral imbalance in the ration, but injections of Ca and P compounds are futile. Occasional determination of specific gravity of bones at slaughter is regarded as a useful guide to skeletal status of a herd.—H. H. Green.

Marek, J., Wellmann, O., & Urbányi, L. (1940). Tanulmányok a rhachitisről és a vele rokon csontbántalmakról. IV. Oesszehasonlitó kísérletek különböző fajtájú és különbözőképen takarmányozott malacokkal. V. Védő- és gyógyító-kísérletek malacokkal az úgynevezett D-vitaminlökéssel. [**Rickets and Related Bone Affections. IV. Comparative Experiments with Piglets of Various Breeds and Kept on Various Diets. V. Preventive and Curative Experiments in Piglets with the So-Called Vitamin D Shock**].—*Állatorv. Lapok.* **63.** 1–3, 8–10 and 19–21. [Absts. from German versions in *Arch. wiss. prakt. Tierheilk.* **75.** 180–195 and 196–203. (1940)].

Marek, J., Wellman, O., & Urbányi, L. (1940). Untersuchungen über Rachitis und verwandte Knochenerkrankungen. VI. Mitteilung: Einfluss des Mineralstoffverhältnisses sowie des D-Vitamingehaltes im Futter auf die Ausnützung der Mineralstoffe. [**Rickets and Related Bone Affections. VI. Influence of Mineral and Vitamin D content of the Food on the Utilization of Minerals**].—*Dtsch. tierärztl. Wschr.* **48.** 69–74. [Hungarian version not yet received].

Marek, J., Wellmann, O., & Urbányi, L. (1940). Vizsgálatok a rhachitisről és a vele rokon csontbántalmakról. 7. A mész-, illetőleg a foszfordús takarmányozás hatása a malacvér alkalitartalékára és közömbösitő képességére. [**Rickets and Related Bone Affections. VII. Action of an Excessive Ca and P Intake on the Alkali Reserve and the Buffer Content of the Blood of Piglets**]. —*Mezőgazdas. kutatás.* **13.** 1–8. [German summary]. [Abst. from German version in *Dtsch. tierärztl. Wschr.* **48.** 201–205. (1940)].

[For previous parts, see *V. B.* **10.** 198].

IV. Experiments are recorded on 23 young pigs of varying breed, on rations of widely divergent content in Ca, Mg, and P. Osteodystrophic disorder, mostly of rachitic type, could be produced either by an inadequate absolute intake of Ca or P, or by pronounced excess of either, even when the one present in lesser amount would have been adequate if acid-base balance, as reflected by E.A. [E.A. being milligram equivalents of CaO and MgO, minus equivalent of P_2O_5 divided by dry matter] had been properly adjusted.

Reduction of Ca and P content of the ration in graduated stages showed that for indoor pigs of 10 kg. weight, not exposed to sunlight, a daily intake of about 5·7 g. CaO and 4·2 g. P_2O_5 in food favourably balanced to + 25 E.A., but deficient in vitamin D, represented the lower limits for adequate bone metabolism. Mere percentage figures for Ca and P in foods are of little significance unless the total daily intake of each, and the acid-base balance of the ration as a whole, are considered.

Adequate Ca intake but seriously inadequate P intake effected small but distinct reduction in P of bone ash, and the relative preponderance of P over Ca tended to raise P content of ash without, however, effecting striking variations from the normal. Excess Mg in the ration, even when very large, only increased the Mg content of bone ash when very low Ca was associated with adequate P.

Large excess of Ca in food tended to reduce inorganic P values in the blood serum. Ca deficiency effected slight reduction of serum Ca, associated with elevation of serum P. Somewhat surprisingly, a moderately low Ca intake with much lower P sometimes reduced the serum Ca without much effect on the inorganic P level. Excess of Mg in the food raised the serum Mg quite markedly—from 2·8–3·2 mg.% up to 5·3–6·1 mg.%. Excess P in the food was sometimes without influence on serum Mg level, but sometimes reduced it as low as 1·5–1·8 mg.%.

[In comparing the observations recorded in this paper with those recorded elsewhere in the literature it must always be borne in mind that the rations selected by the authors were deficient in vitamin D and that the young pigs were never exposed to solar irradiation.]

V. Subcutaneous administration of large single doses of irradiated ergosterol, such as 50,000 I.U. in 2 c.c. of oil, preferably with 1,000 I.U. of vitamin A to encourage growth, was successful in preventing development of

rickets, and in curing clinically established rachitic symptoms in young pigs fed upon a rachitogenic diet. Daily administration of 150 units of vitamin D per 10 kg. live-weight were even more efficient. The authors consider that synthetic vitamin D at a reasonable price would find wide practical application in veterinary therapeutics, particularly when skeletal changes have not advanced to the stage of irreversible deformities.

VI. The authors record data from 29 experiments on 27 young pigs fed upon rachitogenic basal rations supplemented in various ways with Ca, Mg, and P, so as to provide known E.A. values. Certain of the pigs also received vitamin D in oil, either orally throughout or subcutaneously after development of rachitic symptoms. Food and faeces were analysed, and percentage utilization of protein and minerals was calculated.

Beneficial effects of vitamin D were shown not only in superior utilization of minerals but also in utilization of other food constituents, and the authors consider that the primary effect is exercised on metabolism as a whole. Best results were obtained when E.A. values were also favourable.

[The oil containing vitamin D also contained vitamin A so that effects can be attributed to both.]

VII. A series of experiments on 38 pigs showed that with concurrent inadequate provision of vitamin D the pH of the blood was not altered by wide variations in the Ca : P ratio of the diet, but that the alkaline reserve was lowered by excessive P and raised by excessive Ca, when compared with balanced Ca : P and optimal E.A. On diets with E.A. of −80 and Ca : P ratio of 0·76, the alkaline reserve varied from 47–66 vol.% [*i.e.* vol.% CO_2], on diets varying in E.A. from +5 to +25 and Ca : P from 0·20–3·39, it varied from 52–73 with average about 61 vol.%; on diets with E.A. of +80 and Ca : P from 4·20–5·36, it varied from 45–75 with average about 64 vol.%.

The authors distinguish between what they call "acidotic" and "alkalotic" rickets, and believe that variations in alkaline reserve indicate "compensated acidosis" or "compensated alkalosis" affecting the solubility capacity of the blood plasma for bone salts.

[To the abstractor at least, the reasoning is somewhat obscure and throws little further light on bone metabolism. It is also doubtful whether the data would bear statistical analysis. For instance, in two apparently identical experiments in which E.A. was +25 and Ca : P ratio 2·61, *i.e.* both favourable, the alkali reserve was about 54 vol.% in one case and 74 vol.% in the other, a difference much wider than the difference between the averages of 58, 62, and 64 vol.% for the diets of widely divergent E.A. and Ca : P.]—H. H. Green.

Ott, G. L., & Coombes, A. I. (1941). **Rickets in Silver Fox Pups.**—*Vet. Med.* **36.** 202–205.

Experimental rickets in silver fox pups was produced by feeding a ration in which the normal calcium : phosphorus ratio was seriously imbalanced. Foxes which were fed a basal ration low in vitamin D to which $CaCO_3$ had been added in sufficient amount to create a final Ca : P ratio of 7 : 1, developed established rickets after two months. A second group fed on the same basal ration with the same added amount of $CaCO_3$, but with the further addition of K_2HPO_4 in amounts sufficient to re-establish a normal Ca : P ratio of 1·32 : 1, showed no rachitic symptoms and appeared normal in every respect. The ration of the second group contained approximately seven times the normal amounts of Ca and P usually present in a normal diet for foxes. Since the basal ration contained little or no vitamin D, it was concluded that exposure to sunlight provided enough vitamin D to prevent rickets in the second group during the experimental period, but not enough to prevent rickets in the group receiving the ration with the seriously disturbed Ca : P ratio.—N. J. Scorgie.

Green, R. G. (1941). **Chastek Paralysis from Fish Diets.**—*Amer. Fur Breed.* **13.** No. 9. 20.

A preliminary communication intended for fox and mink breeders, who are advised not to risk serious outbreaks of the disease by mixing fresh fish with the total ration day after day. [For a description of the disease, see *V. B.* **10.** 50.]—Alastair N. Worden.

Immenschuh, R. D. (1941). **Nutritional Keratitis in Lambs.**—*Vet. Med.* **36.** 322–323.

A description of two outbreaks in the vicinity of Manhattan, Kansas. The disease, which is clinically very similar to infectious keratitis ("pink eye") but which is attributed to vitamin

A deficiency, is stated to have become much more prevalent of recent years in the Middle West and to be a limiting factor in lamb production in certain areas. In the present outbreaks, recovery usually occurred after feeding on well cured lucerne hay or ground yellow maize, or after cod liver oil therapy in the more severe cases. Sight was not recovered in those cases in which corneal perforation had occurred. In one flock, several lambs were born with a pronounced leucoma involving the lower half of the cornea; it is pointed out that infectious keratitis, although it may affect sheep of almost any age, is never congenital.—A. N. WORDEN.

MØLLGAARD, H. (1938). Ueber Störungen im Zentralnervensystem bei der A-Avitaminose des Schweines. **[Disturbances in the Central Nervous System in Pigs with A-Avitaminosis].**—*Biederm. Zbl. B.* **10.** 214–237. [English summary].

The nervous symptoms and lesions which developed in five pigs fed a diet lacking in vitamin A, but complete in other respects, are described and illustrated by photographs. The sows from which the experimental pigs were obtained were kept on a diet almost free from vitamin A both during the last two months of pregnancy and throughout the period of suckling.

There was no evidence of xerophthalmia, and hyperkeratosis was very slight. The nervous symptoms were due to degenerative changes in the myelin sheaths and axis cylinders and in the related ganglion cells. A striking feature was the localization of the changes to particular nerves, *e.g.* unilateral paralysis of the vestibular, facial, or cochlear nerves. The pyramidal tracts were not involved in the degenerative changes. The clinical symptoms comprised spasticity of various muscles, ataxia, paraplegia, and paralysis of localized muscle groups. The daily administration of 500–600 I.U. of vitamin A failed to prevent the onset of nervous symptoms and the optimum dose was 2,500 I.U. It is stated that 1,500 I.U. is the lowest daily requirement for the prevention of symptoms. There was no interference with growth, so long as feeding was not prevented by the lesions.—E. G. WHITE.

KRAKOWER, C., & AXTMAYER, J. H. (1940). **Effect of Alpha-Tocopherol on Lesions of Skeletal Muscles in Rats on Vitamin A-Deficient Diets.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 583–586.

Acute and chronic vitamin A deficiencies respectively were induced in two groups of young rats. In each case half the animals received weekly subcutaneous injections of a synthetic α-tocopherol ester in olive oil, and the remainder were injected with olive oil alone and served as controls. Extensive microscopic muscular lesions (hyaline degeneration) occurred in all but one of the acutely deficient, and in all the chronically deficient controls, whereas the animals which had received α-tocopherol appeared to be completely protected over the respective experimental periods of about 40 and 150 days.

It is therefore concluded that the muscular lesions hitherto described as occurring in vitamin A deficient rats are in fact due to a deficiency of vitamin E, which should form part of the basal diet in such experiments.—A. N. W.

CABELL, C. A., & ELLIS, N. R. (1940). **Sterility and Depression of Growth in Relation to Age of Male Rats Fed a Vitamin E-Deficient Diet.**—*N. Amer. Vet.* **21.** 539–542.

Different groups of male rats were transferred from normal stock diets to a vitamin E deficient ration at four, eight, and 12 weeks of age respectively. After periods varying from 8–28 weeks on the deficient ration, the rats were returned to the normal stock diet for another four weeks in order to arrest further changes and their fertility was then tested. Subsequent examination of the testes was made in order to determine sperm motility. The four-weeks group showed poor growth rates if permitted to remain for 14 weeks or more on the deficient ration, and subsequent matings indicated that in this group fertility was unimpaired after eight weeks but completely lost after 16 weeks. The eight and 12 weeks groups grew normally; in the former group, fertility was diminished after 16 weeks and lost entirely after 28 weeks, whereas in the 12-weeks group there was evidence of failure to mate in only three cases out of six maintained for 24 weeks on the deficient ration. These results demonstrated that production of sterility on E-free diets depends to some extent on the amount of the vitamin stored in the body and thus on the age at which the animal is given the deficient diet.—ALASTAIR N. WORDEN.

ELVEHJEM, C. A. (1940). **Relation of Nicotinic Acid to Pellagra.**—*Physiol. Rev.* **20.** 249–271.

A brief history of pellagra and of the analogous canine blacktongue is given. From the first association of these diseases with dietary deficiency is traced their connexion with some water-soluble nutrient present in liver and yeast. These observations together with the discovery of the activity of nicotinic acid in the treatment of blacktongue suggested its therapeutic use in pellagra. The amount needed for treatment varies considerably from 50–1,000 mg. per day. Part of this variation may be related to the degree of assimilation, but is more likely related to multiple deficiencies as administration of the acid is much more effective when all other factors are present in optimum amounts; in addition to nicotinic acid other fractions of the vitamin B complex are almost certainly essential dietary constituents for man and dog. The close relationship between nicotinic acid and pantothenic acid, both in chemical properties and distribution, is discussed. The recognition of the nutritional significance of nicotinic acid led to the assumption that its function in the animal body must be related to coenzymes I and II [see *V. B.* **10.** 286 and 456.], and it has been found that nicotinic acid amide is the part of these coenzymes that undergoes reversible oxidation and reduction. Estimation of the coenzyme content of the tissues of dogs and pigs on diets deficient in nicotinic acid, and of dogs with acute blacktongue, showed that the coenzyme-like substances were lower in the liver and muscles than in those of animals receiving liberal amounts of the acid.

It has been shown that nicotinic acid plays a significant role in the nutrition of micro-organisms; the acid is present in most active preparations of staphylococcus growth factor, and it appears to be essential for the bacilli of diphtheria and dysentery, *Staphylococcus aureus*, and for *Proteus*. The review includes tabular information on the nicotinic acid content of various tissues and on the anti-blacktongue activity of various pyridine derivatives.

—Alastair N. Worden.

McElroy, L. W., & Goss, H. (1940). **Development and Cure of "Ring-tailed" Condition in Rats on Vitamin B_6 Deficient Diets.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 717–719.

Ten out of 100 rats which had received a vitamin B_6 deficient diet for about six weeks developed annular tail lesions in addition to the typical dermatitis of the face, ears, and paws. The daily administration of 3 μg. or 10 μg. of synthetic vitamin B_6 resulted in an initial aggravation and subsequent disappearance of the lesions, while similar supplementation of the diets of animals hitherto unaffected by this lesion was followed in some cases by its rapid development and disappearance.—A. N. W.

Stewart, C. P., Learmonth, J. R., & Pollock, G. A. (1941). **Intravenous Ascorbic Acid in Experimental Acute Haemorrhage.**—*Lancet.* **240.** 818–820.

It is shown that intravenous injection of ascorbic acid (*e.g.* 200 mg. per kg. body weight) in small volumes of saline (6 c.c.) causes prolongation of life of cats bled to 50% of their original blood volume. It is suggested that the action of ascorbic acid is to secure a more adequate supply of oxygen to the tissues, and it is therefore proposed that ascorbic acid and similar hydrogen carriers (glutathione etc.) be tried in clinical cases of acute haemorrhage and circulatory failure.—F. Aylward.

PUBLIC HEALTH

Hülphers. (1940). Stockholms stads hälsovårdsnämnd. Kontrollen av saluhållna födoämnem m.m. 1939. **[Report of the Stockholm City Hygiene Committee on Market Foodstuffs Inspection Work in 1939].**—*Skand. VetTidskr.* **30.** 1297–1298.

An account of general measures taken in the course of food inspection. Milk was tested for bacterial content, percentage of fat, and efficient pasteurization. About 22,000 milch cows were examined; those with udder infections such as TB. or streptococcal mastitis were slaughtered or isolated until free from infection. Strict measures were taken to ensure hygiene of byres and of retail dairies connected with the milk supply to Stockholm, and there was sanitary supervision of workers.

Fabritius, L. J. (1939). Kritische Untersuchungen über die Organisation der Milchkontrolle in Helsinki (Helsingfors) mit besonderer Berücksichtigung der dem Kontrollsystem angegliederten

hygienischen Erzeugungskontrolle und deren Ergebnisse. **[Critical Study of Milk Control in Helsinki, Finland]**.—*Inaug. Diss., Berlin.* pp. 100.

F. here gives in detail information about the organization and working results of milk control in Helsinki. The work began in 1928 and was placed under the control of a committee composed of representatives of milk producers, milk distributors, milk consumers, and public health authorities. There is a very thorough system of inspection of cow byres and cows, the collected milk is submitted to routine examination at short intervals for quality and freedom from pathogenic bacteria and dairy farms are correspondingly graded. Farm personnel are medically examined regularly and all disease carriers removed.

F. reviews the hygienic milk control systems of Sweden, Norway, Denmark, Germany, Holland, Switzerland, Estonia, England, and the U.S.A. and claims that the Helsinki system is the best of all. [See also *V. B.* **11.** 635.]
—J. E.

VAN OIJEN, C. F. (1939). Contrôle op de doeltreffendheid van pasteurisatietoestellen voor melk, in het bijzonder met het oog op het passeeren van levensvatbare tubercelbacillen. **[Control of Pasteurizing Plants with Particular Reference to Tuberculous Milk]**.—*Tijdschr. Diergeneesk.* **66.** 1055–1075.

A very detailed description of tests of the efficiency of large-scale pasteurizing plants.
—L. TOBBACK.

—. (1940). **Milk-borne Epidemics in 1938.**—*Bull. Dairy Res. Bur., Mathews Co., Detroit.* **19.** 121–128.

Milk and milk products were the cause of 42 (25%) of the 168 disease outbreaks in the U.S.A. in 1938; by "disease outbreaks" is understood those caused by "vehicles", including also other foods (70), water supplies (48), and unidentified "vehicles" (8). Added to this, more than 2,000 cases of undulant fever are reported each year, many of these being caused by raw milk. A table distributed by the U.S. Public Health Service is included; this gives details of outbreaks, number of cases, method of infection, etc. In every case raw milk, graded and ungraded, was incriminated. Attention is drawn to the increasing number of disease outbreaks caused by bakery goods containing raw milk products. It is concluded that there is no such thing as a safe raw milk supply, and the necessity for state-wide pasteurization is stressed.

BALLARATI, A., & LUGAND, F. R. (1940). Reglamentación al criterio de decomisos de los animales que se faenan en el matadero y frigorífico municipal de la ciudad de Buenos Aires. **[Regulations for the Condemnation of Carcasses at the Municipal Abattoir of Buenos Aires]**.—*Rev. Med. vet., B. Aires.* **22.** 100–138.

A detailed description is given of the anatomy of the lymphatic system of the meat-producing animals. The remainder of the paper describes the regulations for the condemnation, partial or total, of carcasses. In general the regulations resemble those adopted in most countries, with modifications to suit local conditions.—M. W.

RASCHDORFF, H. (1939). Beitrag zum kulturellen Nachweis der Tuberkelbakterien im Blut und Fleisch tuberkulöser Rinder. **[Cultural Demonstration of Tubercle Bacilli in the Blood and Meat of Tuberculous Cattle]**.—*Z. InfektKr. Haustiere.* **55.** 283–299.

A general survey of the literature concerning tubercle bacilli in the blood of human beings and experimental and domestic animals is followed by a short discussion on tubercle bacilli found in the musculature of animals intended for human consumption and by a note on NIEBERLE's findings.

R. first attempted to demonstrate the presence of living tubercle bacilli in the bloodstream of infected animals in abattoirs. Blood was divided into three portions and cultivated according to methods described by SGALITZER, NASTA, or GASPAR & KOVÁC. None of the samples from 110 tuberculous cattle yielded cultures. Eighty-two tuberculous cattle carcasses were examined culturally for evidence of tubercle bacilli in the musculature. The deposit from a gauze filtrate of 10 g. of muscle (*e.g.* from the diaphragm) was ground up in a mortar, mixed with sulphuric acid (to 15%) centrifuged for 20 min., and cultured on Petragnani's medium. Cultures were obtained from 46·3% and confirmed by g. pig inoculation; 2·4% were doubtful, and 51·2% were negative. Bacilli were present in muscle cultures from cases of generalized TB. in 12·5% of cases. In acute miliary pulmonary

TB. with no other principal sites of lesions, cultures were obtained from muscle in 78·3% of cases, and in acute miliary pulmonary TB. with generalized lesions, in 50%. R. concludes that the flesh of cattle with acute miliary pulmonary TB. or with exudative forms of the disease may usually be considered to contain tubercle bacilli.—D. L. ROBARTS.

*BINGEL. (1938). Die Durchlässigkeit der Eischale für Bakterien der Enteritis- (Salmonella-) Gruppe und ihre epidemiologische Bedeutung. **[Epidemiological Importance of the Permeation of the Egg-Shell by Bacteria of the *Salmonella enteritidis* Group].**—*Veröff. Heeressanitätsw.* **105.** 182–191. [Abst. from abst. in *Jber. Vet.-Med.* **63.** 305].

The permeability of the shells of hen's and duck's eggs for bacteria was tested by washing the eggs thoroughly with water, soap, and corrosive sublimate and then placing them in broth containing salmonella.

The bacteria penetrated the egg-shells after a lapse of 2–3 days. It was also possible to demonstrate the migration of bacteria from the interior of eggs to sterile broth containing them.

SJÖSTRÖM, H. (1940). Om utnyttjande av de bakteriedödande ultravioletta ljusstrålarna i livsmedelshygienens tjänst. **[Use of Bactericidal Ultra-Violet Rays in Food Hygiene].**—*Skand. VetTidskr.* **30.** 932–945. [English summary amended].

S. describes the sterilizing lamp constructed by RENTSCHLER & JAMES, which kills bacteria and mould by ultra-violet rays with a wavelength of 2,537 Ångström units. The rays have a rapid action on bacteria suspended in water.

S. illustrates the practical use of the lamp in refrigeration, and emphasizes its hygienic importance in the storage of cheese and for shops.

ROOS, J., & KOOPMANS, S. (1940). **Studies on the So-called Electrical Stunning of Animals. V. Effect of the Alternating Current on Spinal Centres; Relation to Chemical Narcosis.**—*Vet. J.* **96.** 107–117.

Two electrodes were placed subcutaneously in the metatarsal region of cats and, using direct current, the minimum stimulus capable of producing a slight reflex movement of the hip joint was ascertained. Alternating current, in the manner used in electrical " stunning ", was then passed through the skull and the lumbar region. It was found that the minimum reflex stimulus was ineffective for a period after the alternating current was broken, but this period was shortened when application of the alternating period was prolonged. It was concluded that the inhibition of the reflex was due to the severity of the muscular spasms produced during the electrical " stunning ".

Observations were made through an aperture in the skull and it was adduced that the pons varolii plays an important part in the production of the signs exhibited by an electrically " stunned " animal.

Animals in which the cerebral cortex was rendered inactive by cocaine, and those narcotized by ether and other drugs were studied and it was concluded that " stunning " by electricity did not aid narcosis but that these processes mutually weaken one another.

It is considered that so-called electrical " stunning " does not exert a stunning effect on the higher centres of the central nervous system, but that an increase in activity actually occurs.—H. E. BYWATER.

THERAPEUTICS

JOHNSON, S. D. (1941). **Observations on the Treatment of Mastitis with Acriflavine.**—*Cornell Vet.* **31.** 127–148.

The data presented in this paper confirm the favourable results already reported by other workers [see *V. B.* **5.** 522; **9.** 43, and **11.** 397.] in the treatment of chronic mastitis by the intramammary infusion of acriflavine. Thus of 237 treated quarters, 164 (69·1%) were freed of *Streptococcus agalactiae* by one treatment and 204 (86·1%) quarters by one or more treatments. Evidence was obtained that healthy untreated quarters are less susceptible to infection than treated quarters free from infection. A large percentage of the treatments were made on " drying-off " or " dry " udders. The strength of acriflavine used was 1 : 4,000, but later experience showed that 1 : 8,000 gave more favourable results in lactating quarters; not more than 500 c.c. was used for the treatment of each quarter.

A study of " dry " secretions brought out some interesting information on the state of the mastitis in " dry " cows. Of 126 samples from

quarters infected with *Str. agalactiae* in 53 cows, 108 were characterized by the presence of thick pus, or large clots and serum, while 18 samples appeared normal. There was usually some difficulty in " drying off " these quarters ; occasionally there was swelling of a quarter.

—N. J. SCORGIE.

ANDRES, J. (1939). Kapff-Säuregas-Behandlung des Gelben Galtes der Milchkühe. [**Kapff's Acid-Gas Method of Treating Mastitis**].—*Schweiz. Arch. Tierheilk.* **81.** 1–12.

Kapff's acid-gas method of treatment originated from observations in 1909 that workers in chemical acid-producing factories did not contract respiratory diseases as compared with those in other occupations. Since then K. has applied the principle of acid therapy to many diseases of man and animals using his compound (a mixture of undisclosed composition containing organic and inorganic acids with ethereal and aromatic substances) in either liquid or gaseous form. Preliminary treatment of infected milk showed that the acid mixture was lethal to mastitis streptococci. Injections into the udder resulted in a hyperaemic reaction and a strong leucocytosis lasting for 10–14 days, but the milk was only acidified for less than two days owing to the effects of the pH regulatory function of the body.

50 cases of mastitis in cows were treated and it is claimed that 30 (60%) were cured and 4 (8%) improved ; 16 (32%) were not benefited.

A. concludes that the method is promising.

—J. E.

I. *LEO, H. G. (1939). Erfahrungen mit Prontosil ad us. vet. bei der Behandlung der Druse der Pferde. [**Experience with Prontosil in the Treatment of Strangles**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*) **136.** 122].

II. *KURZENHÄUSER, H. (1939). Die Sulfonamidverbindung " Prontosil " bei der Behandlung der Druse. [**Treatment of Strangles by Prontosil**].—*Inaug. Diss., Munich.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **48.** 320].

I. Prontosil therapy was applied to 31 horses with strangles at a remount collection depot, it being given either intravenously and intramuscularly as a 5% solution or perorally in tablet form. In comparison with controls which received only surgical treatment of abscesses, it appeared that prontosil had a beneficial effect and hastened recovery.

II. It was found that prontosil had a favourable effect on the clinical condition, lowered the temperature, and prevented the disease from becoming severe, but that it could not be regarded as a specific.

*WUTZLER, P. (1939). Ueber die Beeinflussung von Streptokokkeninfektionen durch Prontosil. [**Effect of Prontosil on Streptococcal Infection**].—*Inaug. Diss., Giessen.* [Translation of abst. in *Zbl. Bakt. I.* (*Ref.*). **136.** 130].

Soluble prontosil, which in experimental infection of mice with β-haemolytic mastitis and strangles streptococci exerted a favourable effect by prolonging life, is also probably able to act favourably on corresponding infections of domestic animals. In chronic streptococcal mastitis, local or general prontosil therapy has not, however, yielded successful results.

MELLO, A., & ROGICK, F. A. (1940). Ensaio de quimioterapia nas bruceloses. II—Dagenan. [**Chemotherapy of Brucellosis. II. Dagenan**].—*Rev. industr. Anim.* **3.** No. 2–3. 20–25. [English summary]. [For part I, see *V. B.* **11.** 397].

A report on further experiments by the authors in the treatment of experimental brucellosis in g. pigs by dagenan [M & B 693]. The results were not very conclusive but seemed to suggest that dagenan had some beneficial effect. In some of the treated animals there was a considerable diminution in the agglutination titre of the sera.—M. WATSON.

RAO, R. S., & GANAPATHI, K. (1941). **Sulphathiazole in some Experimental Bacterial and Virus Infections.**—*Indian med. Gaz.* **76.** 78–81.

No therapeutic value was observed when sulphathiazole was administered to mice infected with rabies virus and rabbits infected with vaccinia virus.

JAMES, G. V. (1940). **The Effect of Administration of an Acetate on the Detoxication and Therapeutic Activity of Sulphanilamide. II.**—*Biochem. J.* **34.** 633–635. [For part I, see *V. B.* **11.** 128].

J. previously suggested that sodium acetate when administered with drugs of the sulphanilamide class modifies the acute toxicity of sulphanilamide. These experiments on mice

show that acetate given at the same time as sulphanilamide and sulphapyridine rectifies the toxic effect of these drugs by preventing the metabolism of acetate precursors and preventing the fall of the CO_2 capacity; in addition, an alkaline urine is produced in which sulphanilamide is known to be most bactericidal. It is known that the acetyl compound (acetylsulphanilamide) is more toxic in mice and it appears to exert a specific toxic effect although it must also have some effect on the respiratory centre on account of the fall of CO_2.—R. A.

FEINSTARE, W. H., WILLIAMS, R. D., HUNTINGTON, E., & CROSSLEY, M. L. (1940). **The Toxicity, Absorption and Chemotherapeutic Activity of 2-Sulfanilamidopyrimidine (Sulfadiazine).**—*Johns Hopk. Hosp. Bull.* **67.** 427–456.

The acute toxicity (L.D. 50) of sulphadiazine in mice corresponds to a blood concentration of 175–200 mg.%; the corresponding figures for sulphapyridine and sulphathiazole are 80 and 65 mg.% respectively. In experiments in monkeys over a long interval, sulphadiazine produces less tissue damage than does sulphathiazole and sulphapyridine. The blood concentration resulting from given doses of sulphadiazine in monkeys is about four times as high as is the concentration resulting from similar doses of sulphapyridine. Monkeys absorb oral doses of sulphadiazine to high blood concentrations within an hour, but a peak may not be reached until after four or more hours. The bloodstream is not entirely free of the drug 30 hours after the dose. The percentage of the drug conjugated to the acetyl form is small, as compared with sulphapyridine. Sulphadiazine has a high therapeutic activity in experimental infection with pneumococci, streptococci, staphylococci, and Friedländer's bacillus.

—J. M. ROBSON.

WYNOHRADNYK, V., & RADEFF, I. (1939). Tratamentul si preventiunea babesiellozei ovine cu acaprin. **[Treatment and Prevention of Ovine Babesiasis by Means of Acaprin].**—*Arhiva vet.* **31.** No. 4–5. 35–41. [French summary].

The authors treated 600 sheep, heavily infected with *Babesia ovis*, with 0·6–1 0 c.c. acaprin in 5% solution and obtained 53·4% of [? clinical] recoveries. In 3,008 sheep with slight infection they obtained 98·1% recoveries. They also found acaprin to be of considerable use in preventing the disease. Sheep which had been in contact with diseased flocks received 0·5 c.c. of 5% solution within 11 days of contact. This reduced the number of subsequent infections by 90%. Prevention by this means proved more economical than the treatment of individual cases.—M. WATSON.

KOGER, R. B. (1941). **Whole Blood in the Treatment of Anaplasmosis.**—*Vet. Med.* **36.** 316–318.

Successful results are claimed in the treatment of bovine anaplasmosis by the intravenous injection of 2,000–3,000 c.c. of blood obtained from a healthy bovine animal. Freshly collected oxalated or citrated blood or similarly treated blood which has been stored as long as 10–14 days at 35°F. may be used. The theory underlying the use of blood in anaplasmosis is similar to that in any anaemia or in haemorrhage, whereby lowered vitality is overcome and the defence mechanism is resuscitated. It is stated that treated animals recover quickly and are usually feeding normally within 2–3 days. In a series of cases treated with one injection of whole blood the average mortality was 27% as against 67% when Na cacodylate dextrose was used.—N. J. SCORGIE.

CHOUFOUR, J. C. (1940). Mededeeling over de toepassing van mapharside bij de bestrijding van saccharomycose. **[Treatment of Epizootic Lymphangitis in Horses with Mapharside].**—*Ned.-ind. Bl. Diergeneesk.* **52.** 117–121. [German summary].

"Mapharside" (Parke, Davis & Co.), an arsenical preparation which has not yet been used in veterinary science, is proposed to replace neosalvarsan for the treatment of epizootic lymphangitis. In C.'s experiments, the usual dose was 200 mg., given three times at one week's interval, for a horse weighing 250 kg. C. shows in a table the effects of the treatment and the duration of the cure of 19 horses with old or young lesions. The preparation was successful in four cases and was moderately good in two cases.

C. does not consider these results as conclusive as the optimal dosage of this preparation is not yet known. In many cases equally satisfactory results were obtained just as quickly by surgical treatment.—L. TOBBACK.

MARTIGNOLLES. (1940). Traitement de la péripneumonie par la lysococcine inject-

able. (Solution de sulfamide dans le solvant acétyl-méthylamine). **[Treatment of Bovine Contagious Pleuro-Pneumonia with Lysococcine (Sulphanilamide in Acetylmethylamine Solvent)].** — *Bull. Serv. zootech. Epiz. A.O.F.* **3.** 71–74.

M. tested the value of lysococcine against bovine contagious pleuro-pneumonia by intravenous and intramuscular injections. The animals were treated at an advanced stage of the disease when novarsenobenzol would have been ineffective, and in two out of five of the cases a definite improvement was noted.—L. T.

I. Sissoko, M. (1940). Traitement par le quinosol de la péripneumonie contagieuse des bovidés. **[Treatment of Bovine Contagious Pleuro-Pneumonia by Chinosol].**—*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 107–110.

II. Malfroy. (1940). Traitement de la péripneumonie bovine par le soludagenan. **[Treatment of Bovine Contagious Pleuro-Pneumonia by M & B 693].**—*Ibid.* 164–166.

III. Gargadennec, A. (1940). Observations sur le traitement de la péripneumonie bovine. **[Treatment of Bovine Contagious Pleuro-Pneumonia].**—*Ibid.* 175.

I. Eight "serum-producing oxen" [?cattle injected to produce "virus"] were given 3 g. of chinosol in 6% solution intravenously, 2–4 doses being given. S. speaks of favourable results having been obtained, but little detail is given.

II. M & B 693 has recently been used in place of novarsenobenzol in the treatment of bovine contagious pleuro-pneumonia in the Niger colony. M. states that autopsies showed that all animals treated in good time recovered.

III. G. summarizes the results obtained in the Ivory Coast by the use of neosalvarsan and the sulphonamides in the treatment of bovine contagious pleuro-pneumonia.

In one outbreak at Bagatenga 76 animals were affected. Five untreated animals died, 52 were treated with novarsenobenzol and 18 died, and all the 16 treated with lysococcine (sulphanilamide in acetylmethylamine solvent) or "uclaf" died. In an outbreak at Dendé one animal recovered out of five treated with M & B 693. Four animals died out of 49 treated with novarsenobenzol in an outbreak at Korhogo, and one died out of 50 similarly treated in an outbreak at Dimbroko.—L. T.

Sherrick, J. L. (1940). **What Standard for Stock Sprays?**—*Soap.* **16.** No. 9. 92–97.

Attention is drawn to the desirability of having an official test for cattle sprays, because many of the sprays upon the United States market have undesirable properties. Some of the sprays are cheaply made household insecticides which are unsuitable for use on the body of an animal because they are made with light oil having a viscosity of 30–35 sec. Saybolt at 100°F., which is apt to scorch and injure the hide. A heavy oil (viscosity 78 sec.) is not considered suitable, as it blankets the hide for too long a time. The most suitable oil is one having a viscosity of 47 sec. Saybolt at 100°F. A suggested procedure for testing repellency is given.—W. Moore.

Dinulesco, G., & Foisoreano, D. (1938). Recherches sur quelques substances larvicides pour les hypodermes. **[Research on Ox Warble Larvicides].**—*Ann. Inst. nat. zootech. Roumanie.* **7.** Reprint pp. 20. [In French].

Existing information on larvicides for ox warbles is briefly reviewed, and experiments are recorded both on isolated larvae in the laboratory and on parasitized animals. The laboratory tests were made at 37°C., and results read at 30 min. intervals. For *in vivo* tests the animals were killed 1–4 days after treatment. Paraffin, tobacco, derris, pyrethrum, petrol, and benzene were tested. The authors recommend benzene with 2% iodine. [Details are given only of the laboratory results, and in these a 100% kill was obtained in 2–20 hours with all the substances listed. In the *in vivo* experiments derris is dismissed without details, as being inefficient.]—J. MacLeod.

Swales, W. E. (1938). **The Preparation of Sheep for Anthelmintic Medication.**—*Canad. J. comp. Med.* **2.** 57–58.

S. found that, if 2·5 c.c. of 1% copper sulphate were given immediately before the administration of a drug in a capsule or if a drug was suspended in copper sulphate, in order to close the oesophageal groove, previous fasting was unnecessary. This greatly simplified the procedure and prevented loss of condition in the flock.—T. W. M. Cameron.

Swales, W. E. (1939). **Tests of Phenothiazine, a Highly Efficient Anthelmintic.**—*Canad. J. comp. Med.* **3.** 188–194.

S. pointed out that oesophagostomiasis is a common condition in sheep in eastern Canada. He described the preparation and use of a compressed tablet of phenothiazine which increased the efficiency of this drug to 77% against hookworms, 90% against nodular worms, 100% against *Ostertagia* and 80% against *Haemonchus*. The use of these tablets has since been widely adopted.—T. W. M. C.

SWALES, W. E. (1941). **Phenothiazine and Anthelmintic Medication, with Special Reference to Parasitic Diseases of Sheep.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 130–135.

Laboratory experiments with phenothiazine have demonstrated that, for complete efficiency against oesophagostomes, the drug must be present in the rectum of the sheep within eight hours of administration *per os*.

During 1940, 1,500 breeding ewes were treated in the field. In flocks in which the ewes received at least 48 g. of phenothiazine, the incidence of nodular lesions in the lambs was reduced by approximately 94%. In addition, although no anthelmintic treatment was received by the lambs, no case of haemonchosis occurred. There was no significant effect on the numbers of other helminths, except of *Ostertagia* and *Trichostrongylus* spp., which appeared to have been removed to a considerable extent.—D. D. OGILVIE.

COLLIER, H. B. (1940). **The Fate of Phenothiazine in the Sheep.**—*Canad. J. Res.* Sect. D. **18.** 272–278.

The faeces, urine, peripheral blood, and milk of sheep were examined for phenothiazine and its derivatives after oral administration of the drug as previously described [*V. B.* **11.** 720]. About one-half the phenothiazine administered was excreted unchanged in the faeces, while a major portion of the remainder was recovered in the urine. This latter portion had undergone absorption, oxidation, and conjugation; the conjugate was tentatively identified as potassium leuco-phenothiazone sulphate which was also found present in the blood serum and milk.—R. A.

MOSKEY, H. E., & HARWOOD, P. D. (1941). **Methods of Evaluating the Efficacy of Anthelmintics.**—*Amer. J. vet. Res.* **2.** 55–59.

The authors point out that generalizations cannot be made on the merits of the various methods available for testing anthelmintics, and that the facts must be determined by carefully conducted experiments for each substance. The results of *in vitro* tests are not directly applicable to conditions existing in the body of the host animal and must be substantiated by *in vivo* tests.

Three methods of *in vivo* testing are available. (1) The dilution egg count devised by STOLL & HAUSHEER; objections to this method are:—false indications of efficiency with a drug that does not destroy the helminths but depresses their reproductive activity, and its uselessness with medicaments aimed at parasites whose eggs do not appear regularly in faeces, *e.g.* taeniacides. (2) The critical test advocated by HALL, in which the number of worms eliminated in the faeces after treatment plus those found in the animal at autopsy are regarded as the total present at the time of treatment, from which the percentage efficacy of the drug is calculated. It is unreliable with certain taeniacides unless adequate precautions are observed. (3) The controlled test is the most time-consuming of all, but is most valuable when artificial infestations are used, especially for poultry taeniacides. The test birds are infected with a known number of cysticercoids and when the worms are mature, the birds are treated. Two weeks later, all are killed and the worms counted. Either the critical or the controlled test, when properly carried out, yields reliable information in many instances but other methods must, in the authors' opinion, be used cautiously.—J. N. OLDHAM.

POISONS AND POISONING

I. BROMEHEAD, C. N. (1941). **Fluorosis in England. The Geological Aspect as a Guide to Prevention.**—*Lancet.* **240.** 673–674.

II. —. (1941). **Discussion on Fluorosis in Man and Animals.** [Speakers: BOSWORTH, T. J., GREEN, H. H., MURRAY, M. M., BRIDGE, J. C., & WILKIE, J.]—*Proc. R. Soc. Med.* **34.** 391–396.

I. Dental fluorosis was found by WILSON [*V. B.* **11.** 480.], in the course of survey work of the incidence of the condition in England, to be particularly marked in areas lying on Oxford Clay, of which one sample

contained 480 p.p.m. B. assisted WILSON from the geological aspect. Examination of the teeth was made in those areas where geological evidence showed that F was present in appreciable amounts in the strata from which the drinking water was derived and in particular where the F-containing minerals, fluorspar and apatite, occur. The conclusions reached from the geological and medical survey, which is not yet complete, are that well-water derived from or in contact with some clays of marine origin (in particular the Oxford Clay, Lower Lias, and Kimmeridge Clay) is likely to cause human fluorosis. These wells are usually of small yield and supply individual houses or small villages. Borings passing through the clay should be steel lined. Taking into account the possibility that such areas may obtain their water supply in future from larger public supplies of low F content obtained from practically F-free sources, B. considers that chemical processes such as are used in the U.S.A. for reducing the F content of drinking water are unnecessary in England.

II. BOSWORTH referred to the occurrence of chronic F intoxication in (a) volcanic areas of Iceland, (b) areas rich in phosphate deposits, *e.g.* Algeria, Morocco, and Tunis, and (c) areas around industrial fluorine plants in various parts of the Continent. Possible sources of intoxication included the feeding of mineral deposits rich in F and of lees from distilleries where F compounds are employed. In Great Britain an outbreak occurred in the neighbourhood of brickworks, on farms lying in the direction of the prevailing winds. Cattle in particular were affected when grazing, and symptoms included unthriftiness, lameness, emaciation, enlargement of the bones of the jaw, metacarpals, and digits, and exostoses of the ribs. "Mottled" tooth changes resembled those occurring in domesticated animals and man in the "darmous" areas of North Africa. Apart from cachexia, no lesions other than those in the bones and teeth were found. The bones were thicker than normal, with reduced specific gravity. The marrow was reddish and gelatinous and the marrow cavity enlarged. The ribs were very fragile. On maceration the bones showed irregular, chalky white, porous deposits on the surface, and microscopically showed extensive atrophy of the bony tissue and the presence of excessive amounts of osteoid. There was no evidence to show that animals other than cattle were clinically affected, although tooth changes were found in a flock of ewes.

GREEN discussed the chemical work carried out at Weybridge in association with the above outbreak of chronic fluorosis. High F contents of bone and of urine were characteristic features. F in the blood and milk was very low. The F content of the drinking water was low but that of pasture and hay was high, due to surface contamination and not to absorption through the roots. Atmospheric contamination was demonstrated by adsorption methods. The origin of the F lay in the clay used for the bricks, the clay losing one-third of its F at the high temperatures of the kiln. The oily mist containing the F condensed on the surrounding pastures in the direction of the prevailing winds, establishing the complete cycle of events.

MURRAY discussed the literature of acute and chronic fluorosis in man. Chronic endemic fluorosis is acquired mainly through the water supply, and the most commonly observed symptom is "mottled enamel" of the teeth. The pathology of tooth changes was discussed. Some account was given of experimental feeding of F compounds to rats and its effect on bone development.

BRIDGE referred to human cases of F osteosclerosis arising from industrial association with F and to certain biochemical findings in this connexion, whilst WILKIE discussed X-ray findings associated with these cases.—A. EDEN.

VOLKER, J. F., HODGE, H. C., WILSON, H. J., & VAN VOORHIS, S. N. (1940). **The Adsorption of Fluorides by Enamel, Dentin, Bone and Hydroxyapatite as shown by the Radioactive Isotope.**—*J. biol. Chem.* **134.** 543–548.

By the use of radioactive F the capacity of enamel, bone, dentine, and hydroxyapatite to adsorb the element was determined and this adsorption was found to occur according to the Freundlich adsorption isotherm. The adsorption coefficients at 40°C. of both the adsorbed substance and of the adsorbent are calculated for each of the above sources of calcium phosphate. It is suggested that the adsorption of fluorides by enamel may have a clinical significance, as the local application of solutions of fluorides to teeth *in situ* may add sufficient F to the enamel surface to decrease its susceptibility to dental caries.—ALFRED EDEN.

VAN DER MERWE, P. K. (1940). **The Significance of Fluorine Traces in Natural Waters and a Proposed Method to Effect their Removal.**—*Onderstepoort J. vet. Sci.* **14.** 335–357.

The author discusses the literature on the occurrence of fluorine compounds in natural waters and their origin. His method of removing F is to incorporate superphosphate in a modified form in the affected water, and a tertiary phosphate is subsequently precipitated in the aqueous medium by the addition of a basic hydroxide. The active defluorinizing agent is derived from commercial superphosphate. It is estimated that 1 kg. of double superphosphate can remove 9–10 g. of F from solution. The reaction is accelerated by heat. The process of removal of F is concomitant with an improvement in the general nature of the water and there is a reduction in the total solids.—E. M. ROBINSON.

BOLEY, L. E., MORRILL, C. C., & GRAHAM, R. (1941). **Evidence of Mercury Poisoning in Feeder Calves.**—*N. Amer. Vet.* **22.** 161–164.

The most noticeable symptom, in eight out of 150 Hereford heifer calves of approximately 450 lb. body weight which became ill, was inability to rise, and five animals died after becoming progressively weaker. There were no significant bacteriological, parasitological, or macroscopic P.M. findings, but histological examination showed a diffuse cloudy swelling of the hepatic cells and extensive necrosis of the renal tubular epithelium. The animals had been subsisting largely on maize, and it was elicited that this had been stored adjacent to some seed which had been treated with an organic mercurial insecticide. A g. pig and a rabbit died after being fed on the maize for 15 and 30 days respectively. Chemical examination indicated that the maize contained at least 2 0 mg. Hg per kg., and that there were somewhat greater concentrations in the livers and kidneys of the two calves which were examined.
—ALASTAIR N. WORDEN.

STEYN, D. G. (1939). **Alkali Poisoning.**—*Onderstepoort J. vet. Sci.* **13.** 347–358.

After giving a comprehensive review on previous work done on poisoning by alkaline substances, S. describes some experiments in which varying amounts of caustic soda were added to fresh cow's milk which was subsequently fed to rabbits. The effects were studied of caustic soda itself and the decomposition products, especially protein, produced by the alkali. Vomiting, weakness, and muscular twitchings were prominent symptoms; death occurred shortly after drenching.—E. M. R.

VIANELLO, G. (1939). L'avvelenamento da fosfuro di zinco negli animali domestici. [**Zinc Phosphide Poisoning in Domestic Animals**].—*Clin. vet., Milano.* **62.** 684–686.

The author described numerous cases of zinc phosphide poisoning in poultry which had eaten grain treated with it as protection from pests. The birds died suddenly and the carcasses were in good condition. On opening the body cavity a distinct odour of garlic was noticed and this was stronger on opening the gizzard and stomach. The liver was enlarged slightly and was yellow ochre colour with much fatty change. The spleen was normal or slightly enlarged. There was much mucoid material in the gut.

Poisoning is also reported of a number of horses whose food was accidentally prepared in a tub which had contained zinc phosphide. The animals collapsed suddenly, breathing stertorously, and sweating profusely. At autopsy fatty degeneration of the liver was evident and the stomach and small intestine contained much mucus.—MILLER WATSON.

SALCES, F. (1939). Intoxicaciones vegetales. [**Plant Poisoning**].—*Rev. Med. vet., B. Aires.* **21.** 242–259, 368–382 and 477–514.

An extensive list is given of poisonous plants in the Argentine. In the determination of plant toxicity, the principles of STEYN [*V. B.* **11.** 645.] were used. A description of the plants studied, their toxic elements, and the lesions caused by them is given.

*CASSADY, J. T. (1940). **Certain Ecological Characteristics of Orange Sneezeweed.**—*Ecology.* **21.** 87–90. [Abst. in *Exp. Sta. Rec.* **83.** 243, copied *verbatim*].

Studying this poisonous plant (*Helenium hoopesi*) in 87 different areas in the mountains of western Colorado, the author describes it and discusses its plant associates; natural enemies; reproduction, migration, and establishment; and poisonous qualities. It is noted as immediately important to the livestock industry that management practices minimizing

losses be developed for ranges infested with this plant.

RIET, J., ECHENIQUE, L., & SANZ, D. L. (1937). El problema de la intoxicación de los bovinos por el sudan grass. **[Sudan Grass Poisoning of Cattle].**—*An. Fac. Vet., Montevideo.* **3.** 41–57.

Investigation of the irregularly poisonous action of Sudan grass in cattle led to the conclusion that cattle may usually eat large quantities of highly toxic Sudan grass without any ill-effects, but at times may be poisoned by quite small amounts of the grass containing less of the toxic glucoside. It is thought that the normal alkalinity of the ruminal contents is sufficient to prevent the hydrolysis of the cyanogenetic glucoside which only occurs in acid media. Under ordinary conditions the grass becomes so alkaline in the rumen that even after the ingesta reach the abomasum they do not become sufficiently acid to liberate hydrocyanic acid. Factors which may diminish the degree of alkalinity of the ruminal contents are abnormal fermentation, tympanites, rumenitis, and diminished salivation. Very tender, moist pasture diminishes the flow of saliva as does also heavy milking.—MILLER WATSON.

KROLLPFEIFFER, H. (1938). Die Entwicklung der Pferdemaske bei den am Weltkriege beteiligten Staaten. **[The Development of Respirators for Horses in Countries Participating in the War of 1914–18].**—*Inaug. Diss., Leipzig.* pp. 43.

A discussion on the use of the horse in modern warfare and on the need to protect horses against poison gas, and an illustrated description of gas masks used by the armies of Germany, England, France, Russia, America, Italy, and Austria during the war of 1914–18. All these worked on the wet filtration principle. At the present time dry filter gas masks, which are more effective, are indicated exclusively. Hoods with windows are also required to protect the eyes against mustard and similar gases.—J. E.

ANDREONI, R. (1939). Ricerche tossicologiche sull'acqua ipritata. **[Toxicity of Ingested Mustard Gas].**—*Clin. vet., Milano.* **62.** 421–428.

Various solutions of mustard gas in water at the rate of 15 c.c. of solution per kg. body weight were introduced into the stomachs of rabbits. It was found that the products of hydrolysis of mustard gas were harmless even in considerable concentration. Concentrations of 400–500 mg. per litre and upwards of unhydrolysed mustard gas caused gastro-intestinal inflammation, and solutions of 650 mg. per litre proved fatal in 33% of cases. In the rabbit the minimum concentration necessary to provoke gastro-intestinal inflammation is the same as that required to provoke conjunctivitis. This amount caused reddening of the human skin, but the skin of the rabbit proved more resistant than the human skin.—M. WATSON.

ANDREONI, R. (1939). Ricerche sull'intossicazione dei foraggi con aggressivi chimici. **[Contamination of Forage by Poison Gases].**—*Clin. vet., Milano.* **62.** 344–352.

Various fodders were exposed to phosgene in a concentration of 1·5 g. per cu. m. of air, for periods up to six hours. A. found that after the foodstuffs had been aired only a slight odour of phosgene remained. The fodder was eaten by animals without any ill-effects. This is explained by the fact that phosgene was rapidly hydrolysed into hydrochloric acid and CO_2 by the moisture of the foodstuffs and the saliva.

Similar experiments with mustard gas showed that when foodstuffs were contaminated by the gaseous form they were harmless to animals after exposure to air for some hours, or when the superficial layer of the food was removed and destroyed. When liquid mustard gas was sprayed on fodder and on flour it was found that it did not penetrate deeply and removal of the outer layer rendered the food fit for consumption. Jute sacks were found to protect foodstuff almost completely. A. advises the covering of stacks etc. with sacking, straw, thick paper, or other material.—MILLER WATSON.

PHYSIOLOGY

BENEDICT, F. G., & LEE, R. C. (1938). **Further Observations on the Physiology of the Elephant.**—*J. Mammal.* **19.** 175–194. [See also *V. B.* **7.** 251].

Because of the scarcity of precise physiological measurements on the elephant, observations were made on captive circus animals. An exaggerated importance is usually attached to the muscular activity of elephants because of their enormous mass. Analysis of the body

movements showed that only when the animal is moving its body from side to side in the characteristic motion called "weaving" can the muscular activity be sufficient to increase the metabolism measurably. When the animal is not weaving, the movements are generally confined to the seemingly incessant movements of the ears, tail, and trunk. An extraordinarily uniform tempo was noticed in the tail movements and in the weaving motions; the constant movement of the tail was not due to the presence of flies, and extraneous happenings seemed to have no effect on it. It is a common belief that the elephant uses the ears as a heat-radiating surface which can be increased at will by raising the ears from the body, but observations confirmed that the elephant's ears are not moved primarily to aid in heat loss but as a result of nervousness, excitability, or possibly irritability. A study of sleeping positions showed that the elephant frequently changes its body position while sleeping, involving movements of the entire body from the lying to the standing position, and then to the lying position again. If lying, elephants stand up approximately once an hour, either to urinate or to defecate; they never urinate while lying. Observations on the teeth, eating and chewing, body weight, and height are given; it was confirmed that the hearing of the elephant is acute, and reactions observed during the presence of mice and rats showed that the elephant does not have an inherent morbid fear of these small rodents as is commonly believed. Samples of urine and faeces were examined microscopically and for temperature measurements, as well as for certain chemical reactions of the urine. No parasites were found in the faeces of these circus animals, but wild animals are almost invariably infested. Although the elephant is not a ruminant and food apparently remains in its alimentary tract for only a relatively short time, large amounts of intestinal gases are formed, which consist of almost 50% methane, 20% CO_2, and 2·5% O_2 so that an almost perfect condition for anaerobic fermentation exists. Respiration, heart rates, and skin temperatures were measured. While the elephant is standing awake the respiration rate is usually about 10 per minute, but it falls rapidly to half this rate after the animal has settled down in a lying position. The heart rate was measured by electrical means and previous observations were confirmed, *viz*, that elephants have a higher heart rate when lying than when standing. A large number of temperature measurements were made on 16 different locations on the body of 31 elephants and when averaged the maximum difference between the various positions was only 2°C., the lowest average being 28·8°C. and the highest 30·7°C. The differential between the room temperature and the average skin temperature varied greatly; sometimes the difference was as great as 8°C. The influence of the environmental temperature upon the skin temperature was not by any means a linear one, and it therefore seems impossible to calculate the heat loss of the elephant from the measured skin temperature and the temperature of the environment. What proportion of the body heat is lost by direct radiation and what by convection is not yet known, nor is it known whether there is a marked change in the amount of water vapour given off from the skin at higher temperatures; it is pointed out that further research on the physiology of this animal is very desirable.—R. Allcroft.

Olson, T. M. (1941). **The pH Values of the Ingesta of the Rumen of Slaughtered Animals.**—*J. Dairy Sci.* **24.** 413–416.

The pH of 473 samples of rumen liquid was determined and an average figure of 6·8 was found. Many of the determinations were made 22 hours or more after sampling. Samples allowed to stand exposed to the air at room temperature gradually increased in pH [due presumably to loss of carbon dioxide.]

—A. T. Phillipson.

Spörri, H., & Asher, T. (1940). Röntgenologische Studien über die Motorik des Wiederkäuerdickdarmes. **[X-Ray Studies on the Movements of the Large Intestine of Ruminants].**—*Schweiz. Arch. Tierheilk.* **82.** 204–216 and 243–253.

Barium was introduced into the large gut of goats through a caecal cannula. In the proximal portion, consisting of the caecum and proximal colon, peristaltic and anti-peristaltic movements were seen which mixed the ingesta and delayed the onward passage. In the middle portion, the spiral colon, peristaltic and segmentary movements occurred. Pellet formation was first observed in the caudal part of the spiral. In the terminal portion of the large gut pellet formation was advanced and the passage of the ingesta was slow.

Water absorption occurs in all parts of the

large gut, but is greatest in the spiral colon and least in the terminal portion. The function of this latter part is mainly excretory.

Barium was observed to pass forward to the small gut from the caecum through the ileo-caecal valve.—A. T. PHILLIPSON.

EDDS, G. T. (1940). **A Study of the Composition of the Alveolar Air of the Domestic Animals.**—*Amer. J. vet. Res.* **1.** 82–88.

Samples of alveolar air were obtained from horses, cattle, sheep, goats, and dogs; three animals of each species were used with the exception of the first species from which samples were taken from one individual only.

Alveolar air was obtained by causing the animal to make a forced expiration into a rubber mask after a normal respiration. Samples were obtained through a small side tube opening into a wide-bore tube attached to the mask and were analysed by the use of the modified Haldane-Henderson apparatus.

The results in all species were much the same; CO_2 varied from 4·59–5·32 c.c.% and O_2 from 14·99–15·69 c.c.%.—A. T. P.

BOYD, E. M., & JOHNSTON, G. M. (1940). **Seasonal Variation in the Water Content of the Respiratory Tract.**—*Amer. J. med. Sci.* **199.** 246–255. [Abst. in *Arch. Path.* **30.** 819, copied *verbatim*].

The percentage of water in the lungs of guinea pigs and albino rats was found to remain remarkably constant. Pearson's coefficient of variation averaged about 1. In the albino rat a significant increase in the water content occurred during the first cold spell of the autumn weeks, and a significant drying of the respiratory tract took place in the winter in animals housed in a building heated by a hot water system. These changes affected all parts of the respiratory tract, especially the trachea and the proximal part of the lung in the autumn and the distal part of the lung in the winter. The correspondence of these seasons to those in which respiratory infection is epidemic has been noted.

STEYN, H. P. (1940). **Some Physiological Aspects of Mammary Function with Particular Reference to the "Drying Off" of Dairy Cows and Chronic Bovine Mastitis.**—*J. S. Afr. vet. med. Ass.* **11.** 123–137.

S. discusses the values of the various methods in use for "drying off" cows in lactation and strongly advocates the method of abrupt cessation of milking with the proviso that the feeding should be properly controlled prior to the "drying off". It is considered safe to "dry off" a cow by this method when her milk yield has dropped to half the maximum or less, provided that she is not giving more than two gal. per day. This method is suggested as a result of critical physiological investigation. It appears to have many advantages and predisposes cows less than other methods to the danger of mastitis, as the physiological disturbance is limited to a few days whereas in the intermittent method the ill-effects continue over 2–3 weeks.—E. M. ROBINSON.

WILDE, W. (1938). Ueber den Zellgehalt der Milch gesunder Tiere. **[The Cell Content of the Milk of Healthy Cows].**—*Inaug. Diss., Leipzig.* pp. 36.

W. studied over a period of nine months the cell content of the normal milk of 13 cows, which as producers of the highest quality milk were kept in the best conditions. Both raw and heated milk taken at morning and evening was examined with the aid of Skar's cell-count microscope. The results for each cow are given in tables and the leucocyte counts of all cows are given in another table to show average, minimum, and maximum numbers. The average leucocyte count varied among the cows from 32,000 to 1,280,000 per c.c., being in three cows below 100,000, in six cows between 100,000 and 200,000, in three cows between 200,000 and 300,000, and in one cow over 300,000. Epithelial cells came next in frequency with 10,000–40,000 per c.c. and lymphocytes numbered about 10,000 per c.c. on the average.—J. E.

SYKES, J. F., & ALFREDSON, B. V. (1940). **Studies on the Bovine Electrocardiogram. I. Electrocardiographic Changes in Calves on Low Potassium Rations.**—*Proc. Soc. exp. Biol., N.Y.* **43.** 575–579.

ALFREDSON, B. V., & SYKES, J. F. (1940). **Studies on Bovine Electrocardiogram. II. Bundle Branch Block.**—*Ibid.* 580–585.

I. A diet low in potassium produced an increase in the Q.R.S. interval of the electrocardiogram. The K of the serum dropped to the region of 10 mg.% but the changes in the ventricular complex following this fall were delayed. After normal feeding was resumed

and the serum K had returned to a normal level the increased Q.R.S. interval persisted. On P.M. examination pathological changes were found in the Purkinje system of the heart.

II. The normal Q.R.S. interval in cattle was found to vary from 0·06–0·12 sec. Section of the right and left branches of the bundle of His produced little disturbance in comparison with those found in the dog. The changes in the form of the ventricular complex were greater after section of the left branch than after section of the right. It is suggested that the comparatively slight response found in calves is due to differences in the intra-ventricular conducting system. Histological evidence is quoted to show that in the ox, and to a large extent in the pig and sheep, the Purkinje system penetrates the outer walls of the ventricle, while in the dog it does not. It is suggested that in the ox intra-ventricular conduction travels *via* the Purkinje system.

—A. T. PHILLIPSON.

BARNES, J. M. (1940). **The Enzymes of Lymphocytes and Polymorphonuclear Leucocytes.**—*Brit. J. exp. Path.* **21.** 264–275.

Lymphocytes were obtained from the thoracic duct lymph, and polymorphonuclear leucocytes from the peritoneal cavities, of cats and rabbits. Cathepsin, nuclease, amylase, lipase, lysozyme, and adenosinase were present and trypsin and erypsin absent from both the lymphocytes and polymorphs of the rabbit. The amount of adenosinase present in these cells was greater than in any other tissues of the rabbit. The theory that polymorphs develop from the lymphocytes is supported by the above results, the same enzymes being present in each of the two types of cells.

The results obtained in the cats were somewhat different, *e.g.* the lymphocytes contained no trypsin, although the polymorphs contained large amounts.

The polymorphs of the rabbit contain large amounts of lysozyme and it is probable that the bactericidal agent hitherto called leukin (PETTERSSON, 1905) is lysozyme. It is present in small amounts only, in the polymorphs of the cat.—F. AYLWARD.

SANDERS, A. G., FLOREY, H. W., & BARNES, J. M. (1940). **The Output of Lymphocytes from the Thoracic Duct in Cats and Rabbits.**—*Brit. J. exp. Path.* **21.** 254–263.

Methods are described for collecting lymph continuously for several hours from the thoracic ducts of cats and rabbits. This lymph contains about 5% large lymphocytes and monocytes, the rest of the cells being small lymphocytes. The daily replacement factor (number of lymphocytes collected from the duct: total number of lymphocytes in the circulation) for blood lymphocytes varied from 0·5–3·5 in the cat to about 5 in the rabbit. Reasons are given for regarding this as a minimum figure.—F. AYLWARD.

YOFFEY, J. M. (1941). **The Lymphatic Pathway for Absorption from the Nasopharynx.**—*Lancet.* **240.** 529–531.

Following the work on the absorption of dyes from the nasopharynx [*V. B.* **9.** 807.], Y. undertook experiments to test the pathway of other substances. With proteins it appears that the size of the molecule is the determining factor, as egg albumin with a molecular weight of 34,500 traversed the nasal mucosa and entered the lymph stream as readily as the dye T-1824 with a molecular weight of 960, while horse serum, with a molecular weight of about 175,000, was never detected either in blood or lymph. The absorption of proteins from the nose is related to the question of immunization by nasal instillation of toxins and antitoxins. Viruses are very much larger than any of the protein molecules so far discussed and vaccinia virus could not be detected in the cannulated tracheal duct of the monkey, cat, or rabbit up to nine hours, although it was found in the rabbit at a later stage. The position of viruses and bacteria is rather complicated both by the types of virus and bacteria used, and by the species of animal concerned, as the susceptibility of the host is the most important factor to be considered. Viruses are cytotropic so that in the case of a virus such as vaccinia, the lymph node actually encourages the spread of infection rather than prevents it, as the virus multiplies in the node and is carried to the blood stream by the lymphocytes in the efferent lymph. The experimental observation that some if not all bacteria can pass through nodes indicates a somewhat imperfect barrier function. It seems that the lymphocyte is the medium by which a virus is carried throughout the body.—C. W. O.

LOOFBOUROW, J. R., DWYER, C. M., & LANE, M. M. (1940). **Proliferation-promoting Intercellular Hormones. I. Quantitative Studies of Factors Produced by**

Injured Animal Tissue Cells.—*Biochem. J.* **34.** 432–441.

As a result of injury by lethal ultra-violet irradiation of newt, chick, and rat tissues, intercellular wound hormones were produced which stimulated the proliferation of yeast and which could be assayed by quantitative yeast growth methods. Evidence has been obtained that repeated injection of the proliferation-promoting intercellular hormone leads to the production of tumours in rats. It is probable that the substance is a guanine-adenine-nucleotide complex.—J. A. Nicholson.

Chargaff, E., Olson, K. B., & Partington, P. F. (1940). **The Formation of Phosphatides in the Organism under Normal and Pathological Conditions.**—*J. biol. Chem.* **134.** 505–514.

Following the administration by stomach tube of radioactive P in the form of sodium phosphate to the rat and rabbit, studies were made of the formation of phosphatides in the various organs by measurement of the radioactivity. The lecithin and cephalin fractions were separated, the P content and its degree of radioactivity were determined, and calculations were made of the ratio of the amount of the newly formed phosphatide to that of the total phosphatide content. Rats were partially hepatectomized and the formation of phosphatides was studied following the administration by stomach tube of sodium phosphate of known radioactive P content. The effect of hepatectomy was to produce a considerable disturbance of the phosphatide metabolism, particularly in the liver and intestinal tract. The biological significance of these findings, for which the reader is referred to the original, is discussed.

—Alfred Eden.

I. Campbell, W. W., & Greenberg, D. M. (1940). **Studies in Calcium Metabolism with the Aid of its Induced Radioactive Isotope.**—*Proc. nat. Acad. Sci.* **26.** 176–180.

II. Greenberg, D. M., Campbell, W. W., & Murayama, M. (1940). **Studies in Mineral Metabolism with the Aid of Artificial Radioactive Isotopes. V. The Absorption, Excretion, and Distribution of Labeled Sodium in Rats Maintained on Normal and Low Sodium Diets.**—*J. biol. Chem.* **136.** 35–46. [For previous parts, see *V. B.* **11.** 406 and 564].

III. Copp, D. H., & Greenberg, D. M. (1941). **Studies in Mineral Metabolism with the Aid of Artificial Radioactive Isotopes. VI. Cobalt.**—*Proc. nat. Acad. Sci.* **27.** 153–157.

I. The metabolism of Ca in the rat was studied by the aid of a Ca^{45} isotope, with a half-life period of 180 days, using a screen-wall counter tube to measure the radioactivity. In the post-absorptive state the Ca was administered as the lactate by stomach tube, and the amount absorbed was found to exceed 89% with nearly 66% recovered in the urine. The difference was accounted for by retention in the tissues, being greatest in bone and teeth, intermediate in the intestinal wall, heart, lungs, and skin, and least in the remaining tissues.

II. Rats maintained on a basal diet low in Na, and others on the same diet with adequate Na added, were fasted for 24 hours and dosed with radioactive Na as NaCl by stomach tube, and the Na in the excreta was determined. After known intervals of time the rats were killed and the Na content of the various organs was determined. The radioactive Na was absorbed from the alimentary tract more rapidly than was previously found for potassium. Animals on the Na-low diet retained more Na than the controls. The course of excretion of "labelled" Na in the urine followed an exponential curve. The absorbed Na was so rapidly distributed throughout the fluids and tissues of the body that maximum specific accumulation was reached in about 10 min., and this amount persisted at constant level for many hours. There were no significant differences between the levels of the Na content of blood and tissues of the Na-low group and the control group.

Details are given of a method for calculation of the distribution of Na in tissues from the values obtained after administration of radioactive Na; the calculations made were in fair agreement with those made from total Na content, indicating that "labelled" Na rapidly permeated to all parts of the animal body where Na is normally present. One exception, however, lay in the values for the muscular tissues of Na-low rats, where there was a steady increase in specific Na content towards the end of the experimental period.

III. The metabolism of Co in the rat was studied with the aid of radioactive Co. Rats were given 10 mg. Co either intraperitoneally

or by stomach tube, and the excretion in urine and faeces was followed. The urine was found to be the principal channel of excretion, most of the Co being quickly eliminated. After four days the Co content of the tissues was determined and less than 5% of the amount dosed was recovered, indicating, according to the authors, that the requirement of the body for Co is exceedingly small.—ALFRED EDEN.

FRENEY, M. R. (1940). **Chemical Investigations on the Fleece of Sheep.**—*Bull. Coun. sci. industr. Res. Aust.* No. 130. pp. 52.

The first part of this bulletin is devoted to a review of the chemistry of the main fleece constituents, *viz*, the wool fibre, wax, suint, epithelial debris, adventitious dirt and moisture. The substances extracted from the raw fleece with an organic solvent are usually considered to constitute the wax fraction, while those extracted by water are considered to be the suint. These definitions are inadequate since substances are present in the fleece which are soluble in both water and organic solvents and will dissolve therefore in whichever reagent is used first. The methods of estimating wax and suint are considered in detail. The wool wax is oxidized after secretion and this may account for the presence in it of oxygen-containing acids. The suint fraction consists of about 20% of potassium soaps of fatty acids including all between palmitic and valeric acids; other organic constituents present are lactic, hippuric, and succinic acids, urea, lanaurin (a pigment), and other unidentified nitrogen-containing compounds. Suint differs fundamentally from human sweat as potassium chloride is abundant and sodium chloride is present only in small amounts.

Although much is known of the composition of suint, its function in the fleece is not apparent. Three possibilities exist; it may be (1) a true excretion of the skin, (2) a constituent of true sweat utilized to regulate the temperature of the animal, or (3) purely protective in nature. Although some experiments were made to determine whether sheep sweat during vigorous exercise in hot weather, no evidence for such sweating was obtained. The technique used was not free from criticism and it is considered possible that a relationship between suint and a true sweating may yet be established.

Fleece samples were collected from skin areas of definite size from five locations on the bodies of eight sheep in order to determine the size and location of an area representative of the whole fleece for sampling purposes. Fleece samples cannot be compared with accuracy by calculating the percentages of each fleece constituent in the greasy wool, as the variable and adventitious amount of dirt present makes such percentages fallacious. A satisfactory method of comparing samples is discussed. In addition to these ordinary fleece samples the secretions of the inguinal region and interdigital pouch were examined. The "yolk" aggregations on the inguinal skin were found to consist roughly of one-third wax, one-third water soluble material, and one-third insoluble material largely composed of proteins. The wool surrounding these areas was found to contain wax and suint in equal amounts, whereas in the main fleece area the wax is much more abundant than the suint. The secretions which collect in the interdigital pouch and which appear waxy, were found to contain up to 66% of water and a considerable amount of soluble protein.

The distribution of the fleece constituents along the fibre was also studied. A tendency of the wax to migrate to the tip of the staple was noted, as well as a tendency for the suint to be leached from the tip toward the base of the staple. The distribution of the fleece constituents along the staple depends so much on the physiological state of the animal, especially its nutrition, during the growth of the staple that no normal distribution can yet be specified. Similar distribution tendencies, however, were noted for each sheep in a group grazed together as one flock. A different distribution, entirely consistent throughout the group, was noted in another series of sheep run under a different environment.—H. B. CARTER.

TECHNIQUE AND APPARATUS

MILES, A. A. (1940). **The Rosenthal Anaerobic Method.**—*Lancet.* **239.** 7.

M. points out that in this method [see *V.B.* **8.** 474.] of producing an anaerobic atmosphere in a closed jar, pure chromium must be used. The gas evolved from technical chromium powder in combination with sulphuric acid is bactericidal for some and bacterio-

static for other species of spore-bearing anaerobes. Susceptibility to the atmosphere created varies with different strains, but growth is never as good as that in the McIntosh-Fildes jar. The lethal gas is probably hydrogen sulphide, but attempted modifications made to absorb the gas while the simplicity of the method was retained, were unsuccessful.—J. K.

MULLEN, J. P., & MCCARTER, J. C. (1941). **A Mordant Preparing Formaldehyde-Fixed Neuraxis Tissue for Phosphotungstic Acid Hematoxylin Staining.**—*Amer. J. Path.* **17.** 289–291.

Mallory's phosphotungstic acid haematoxylin is a widely used stain which gives excellent differential results when sections are fixed in Zenker's fluid. Sometimes it is more convenient to use one kind of fixation, and this paper describes the use of a mordant, chromium chloride, which enables sections fixed in a 4% aqueous solution of formaldehyde to be stained as effectively as those fixed in Zenker's fluid. —C. HORTON SMITH.

MISCELLANEOUS

—. (1939). IV. Internationaler Tierzuchtkongress, Zürich (Schweiz), 9.-12. August 1939. Hauptberichte mit Schlussfolgerungen. **[4th International Animal Breeding Congress, Zurich, 9th-12th August, 1939. Principal Papers and Conclusions].** pp. 147. Zug, Switzerland: Organisationskomitee. [In English, French, German and Italian].

—. (1939). IV. Internationaler Tierzuchtkongress, Zürich (Schweiz), 9.–12. August 1939. Zusammenfassungen der Sektionsmitteilungen. **[4th International Animal Breeding Congress, Zurich, 9th-12th August, 1939. Summary of Sectional Communications].** pp. 110. Zug, Switzerland: Organisationskomitee. [In English, French, German and Italian].

The connexion between animal breeding and disease was covered at this congress by section V, question no. 7, *viz*, "Modern Means of Breeding and Management for the Control of Disease". WELLMANN (Budapest) gave a long general paper on this subject and some 12 persons contributed short papers.

As this ground has been covered at greater length in the veterinary literature by the same workers, it is not necessary here to deal with the papers individually.—J. E.

—. (1940). **Development of Certain British Veterinary Services Overseas. [Northern and Southern Rhodesia, Gold Coast, British Somaliland, Fiji, and Nigeria].**—*Vet. Rec.* **52.** 673–677, 866–867 and 880–881.

The circumstances leading to the appointment of the veterinary staffs are given. In Southern Rhodesia it was a serious invasion of rinderpest in 1896 which led to the appointment of the first Government veterinary surgeon. The formation of the veterinary departments and the appointment of veterinary officers in Northern Rhodesia, the Gold Coast, British Somaliland, and Fiji followed at intervals. The names of the more prominent veterinary officers in the various departments and the work with which they were associated, are given. The most important of the diseases with which the veterinary departments had to contend in their early days were :– in Southern Rhodesia East Coast fever, foot and mouth disease, and trypanosomiasis ; in Northern Rhodesia anthrax, trypanosomiasis, bovine contagious pleuro-pneumonia, and sheep scab ; in the Gold Coast rinderpest and bovine contagious pleuro-pneumonia. In Fiji there were no serious disease losses, though many diseases are present. In Nigeria the decimation of the herds by rinderpest was again responsible for the formation of a veterinary department. With a limited staff little could be done to stem the tide of disease until 1925, when the veterinary laboratory was established at Vom. In addition to rinderpest, bovine contagious pleuro-pneumonia, black-leg, anthrax, and other diseases take their toll. The work of the laboratory is described. Animal husbandry plays a large part in the activities of the department, and the improvement of stock and their products is described.—R. FISHER.

I. —. (1939). **Food and Life. United States Department of Agriculture. Yearbook of Agriculture 1939.** pp. 1165. Numerous figs. Washington, D.C.: Superintendent of Documents. [8vo] [$1·50].

II. —. (1940). **Farmers in a Changing**

World. United States Department of Agriculture. The Yearbook of Agriculture 1940. pp. xii + 1215. Numerous figs. Washington, D.C.: Superintendent of Documents. [8vo] [$ 1·50].

I. This volume contains technical and non-technical material so that it may be of use to different groups of readers, and the nutrition both of human beings and of farm livestock is reviewed.

Part I, consisting of about three hundred pages, deals with human nutrition. Chapters in this section which may be of special interest to veterinarians are those dealing with " Food Functions and the Relation of Food to Health ", " The White Rat as a Contribution to Science ", a group of five articles on human requirements for carbohydrates, fats, energy, protein, minerals, and vitamins, and on the vitamin content of foods, and two chapters entitled " United States Meat Inspection " and " Supervision and Inspection of Milk ".

Part II on animal nutrition comprises the larger part of the book, consisting of about 670 pages. An introductory article to this section gives some fundamentals that connect soil and plant management with animal and human nutrition; this is followed by an article on the digestive processes of animals. The whole of this section contains much interesting information and includes chapters on the relation of diet to maintenance, health, growth, fattening, meat production, reproduction, and the production of wool and hides. The nutrition of very young animals is considered and this is followed by chapters dealing specifically with the nutritional requirements and feeding problems of various animals, *viz*, beef cattle, dairy cattle, swine, sheep, goats, horses, dogs, fur animals, poultry, and certain game birds. The next four chapters deal with the relative values of the principal livestock feeds available to farmers and the next gives the results of a questionnaire of deficiencies and excesses of P, Ca, I, Co, Cu, Fe, F, Se, and cyanides in certain areas in the U.S.A. The last chapter includes a set of tables giving the composition of the principal feeding stuffs.

A summary of all the chapters is given at the beginning of the book and a good bibliography and index are appended.

II. This volume of the yearbook which may not be as interesting to veterinary readers as that of 1939, reviewed in I, deals with economic and social conditions in agriculture in the U.S.A. The problem of soil erosion is also discussed.—R. Allcroft.

de Kock, G. v.d. W., Sterne, M., & Robinson, E. M. (1940). **Sterilization of Bone Meal.**—*J. S. Afr. vet. med. Ass.* **11.** 138–141.

Owing to the fact that a number of samples taken from imported bone meal both at the ports and from consignments distributed in the country have shown the presence of *Bacillus anthracis*, some experiments were carried out to determine what sterilization is necessary to ensure a product satisfactorily free from pathogenic bacteria. A number of samples produced gas gangrene when inoculated into g. pigs; this was considered evidence of inefficient sterilization. In experimental work carried out at local bone-meal factories, it was found that a pressure of 40 lb. to the square inch in a digester was effective in sterilizing anthrax-infected bones, badly putrefied bones being sterilized in two hours. The naphtha process was also found to be effective. The previous regulations demanded sterilization by subjection to steam at 115°C. for 15 min. or to dry heat at 140°C. for three hours. For bone meal imported into South Africa the new regulations demand freedom from (1) *B. anthracis* and (2) organisms of the gas gangrene type. As it is expected that for local bone-meal factories the sterilization processes considered adequate would be indicated, the regulations require (1) saturated steam under pressure of not less than 40 lb. to the square inch for not less than two hours in a digester of not more than 4 tons capacity, (2) treatment with vapour of benzene boiling between 95°–115°C. for not less than four hours followed by steam at 80 lb. per square inch for two hours or benzene alone for eight hours, or (3) any other approved process.
—E. M. Robinson.

Dalla Valle, J. M. (1941). **Note on the " Most Probable Number " Index as Used in Bacteriology.**—*Publ. Hlth Rep., Wash.* **56.** 229–234.

D. has examined statistically the significance of the " most probable number " index of the estimate of a bacterial population by the three dilution method of N-tubes as reported by Halvorson & Ziegler [*V. B.* **5.** 52]. By means of a suitable nomogram a simplified solution is proposed of the Greenwood-Yule

equation for determining the most probable number of bacteria per c.c., and calculations are made of the standard deviation when the three dilutions employed are in the ratio of 10 : 1 : 0·1. From these results, D. postulates that little reliability can be placed on the accuracy of the "most probable number" determination if the number of tubes employed at each dilution is less than 20. He states, moreover, that all the information that can be obtained by the use of these dilutions is (1) an estimate of the number of bacteria present in a sample of unknown pollution, and (2) the allocation of a discrete value statistically derived regardless of the combinations of positive and negative tubes or "skips" obtained. When the number of tubes considerably exceeds 20 the accuracy obtained is of the same order as can be obtained by using a single dilution. If the probable number can be roughly estimated the use of three dilutions adds little to the accuracy of the result. [See, however, the later results of HALVORSON & MOEGLEIN—*V. B.* **11.** 486.] —ALFRED EDEN.

BERG, W. N. (1941). **The Law of Small Numbers As Applied to Virulence Measurement.**—*Amer. Rev. Tuberc.* **43.** 685–691.

By means of calculations made from Poisson's Law of Small Numbers, it is shown that a syringe containing a calculated average dose of one tubercle bacillus per dose of 1 c.c. will deliver doses containing no bacilli 37 times out of 100 trials, and a syringe full of a suspension containing five bacilli per dose will deliver a sterile dose once per 100 trials. With a calculated delivery of ten bacilli per c.c. dose, the numbers actually delivered vary from 3 to 18, distributed in accordance with Poisson's Law. On these grounds it is, in fact, impossible to inject g. pigs or to seed cultures with small equal numbers of bacilli.

The practical bearing of this is on suggestions that a bovine strain of *Mycobacterium tuberculosis* can be transformed into a human strain, merely on the results of a diminished virulence for g. pigs. The argument is most probably faulty in that no attention was given to the possibility that in attempts to inoculate the animals with small numbers of live bacilli per 1 c.c. dose, actual inoculations containing no bacilli were given, in accordance with the above calculations. Such sterile doses become apparent if, when with reputed equal doses of bacilli some g. pigs fail to develop TB. or some culture tubes remain sterile, attempts are made to determine the actual number of live bacilli in the doses employed.—ALFRED EDEN.

LEA, S. E., HAINES, R. B., & BRETSCHER, E. (1941). **The Bactericidal Action of X-Rays, Neutrons and Radioactive Radiations.**—*J. Hyg., Camb.* **41.** 1–16.

The bactericidal effects of the α-, β- and γ-rays of radium, X-rays of various wavelengths, and neutrons was studied upon *Bacterium coli* and spores of *Bacillus mesentericus* by exposure of the bacteria in shallow depths to approximately equal intensities of radiation. The number of bacteria surviving treatment decreased exponentially with time. The lethal dose was independent of the intensity of the radiation and of the temperature of exposure, and varied according to the nature of the radiation, being greatest with vegetative forms for those radiations, in particular α-rays, which produce their ionizations close together.

The results are interpreted in terms of the "target" theory, that is, the lethal effects are stated to be due to the passage of the ionizing particles through a special, sensitive region or "target" in the organism. Although genes in the Mendelian sense have not been recognized in bacteria, the authors postulate a coincidence of the "target" region and gene, and suggest that the lethal action of radiation is really the production of lethal mutations. By calculation from the present data they deduce the number of genes in *Bact. coli* to be about 1,000.—A. E

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1941). **Thirty-Eighth Annual Report of the Imperial Cancer Research Fund, 1940-1941.** pp. 33. London: Royal College of Surgeons. [4to].

This report shows that the work of the Fund has been carried on much as usual in spite of the absence of members of the scientific and technical staff on war service. Most of the work described in the report has already been published. PULLINGER has studied the pathology of skin lesions in mice produced by various carcinogenic compounds. CRABTREE has

studied the inhibiting effect of various acid chlorides on tumours experimentally induced in the skin of mice. Although normal chicken fibroblasts can be converted into malignant cells *in vivo* by treatment with filtrates of avian sarcomas, it has so far proved impossible to produce this transformation *in vitro*; LUDFORD has attempted, so far without success, to eliminate the technical and other difficulties which may account for this failure. The same worker, together with PURDY, has studied the problem of immunity to virus-induced tumours with reference both to anti-virus bodies and to anti-tumour-cell factors. In mice in which mammary tumours are induced by administration of oestrone over long periods, it has been observed that the anterior lobe of the pituitary is frequently enlarged. The enlargement diminishes when oestrone administration is stopped and the gland returns to normal. The accompanying histological changes have been studied by VASQUEZ-LOPEZ, who has also studied the histology of the pituitary in the horse, ox, sheep, rabbit, rat, and mouse.

—E. G. WHITE.

CANADA. (1938). **Twenty-First Annual Report of the National Research Council of Canada, 1937-38.** pp. 178. 5 appendixes. Ottawa: National Research Council. [8vo] [75 cents].

The staff of the Council, together with those working under committees appointed by the Council for special investigations, numbered 251 persons, organized in six divisions. A number of Associate Committees correlate the work of all Canadian research organizations concerned with specific problems.

The report of the ASSOCIATE COMMITTEE ON WOOL states that the deficiency disease of sheep, noted in previous reports to be prevented by the use of alfalfa hay in the diet, had been found by SACKVILLE to be preventable by the addition of minute quantities of cobalt to the ration. Cobalt has since been found in substantially greater amount in alfalfa than in the grass normally fed.

The report of the ASSOCIATE COMMITTEE ON PARASITOLOGY states that PARNELL, working on the control of EQUINE STRONGYLOSIS, has investigated the proportions of various chemicals necessary to kill the free-living stages of horse sclerostomes in fresh faeces. Giving common salt a value of 100, the following are some of the results:– formalin 30, sodium hydroxide 80, carbon tetrachloride 166, trisodium phosphate 300, potassium permanganate 400, and 1% sodium hypochlorite 600. GRIFFITHS proved the ability of the following sheep helminths to survive normal Canadian winters on pasture and to infect sheep in the following spring:– *Moniezia expansa*, *Ostertagia circumcincta*, *Nematodirus filicollis*, and *Trichostrongylus colubriformis*. SWALES made a detailed study of the parasites of sheep in Quebec and Ontario [see *V.B.* **11.** 696]. GRIFFITHS continued investigations on the bionomics of the genus *Strongyloides* and some interesting results were being obtained. Field experiments to determine the intermediate host of *Fasciola hepatica* in the Lower St. Lawrence Valley were discontinued, although no positive results could be obtained.

Studies on parasites of carnivores included work on *Apophallus venustus*, which was continued by CAMERON. The fish, *Catostomus commersonii*, was confirmed as the main carrier of the liver fluke, *Parametorchis noveboracensis*. *Diphyllobothrium latum*, the "fish tapeworm" of man and carnivores, was found to be widespread in Canada. *Skrjabingylus nasicola* was implicated by SWALES as the cause of skull lesions in various Canadian mammals of the weasel family. In TRICHINOSIS investigations, 2·06% of 739 samples of pork from Manitoba, Ontario, Quebec, and Prince Edward Island, were found to contain living larvae. A list of the papers published is given.

The ASSOCIATE COMMITTEE ON TUBERCULOSIS reports on investigations by RANKIN on intravenous and subcutaneous vaccination with BCG in experimental bovines. Ninety-two calves from TB.-free herds were isolated in 1932 and fed on pasteurized milk. When four months old, and after negative tuberculin tests, 50 were given double vaccination with BCG, intravenously and subcutaneously, while 42 acted as controls. The herd was kept in isolation until July 1934, the vaccinated animals being revaccinated subcutaneously three times. Tuberculin tests in January 1933 and June 1934 showed all animals to be negative. In July 1934, the animals were all exposed to infection.

In May 1936, six animals from the control group were all found P.M. to be infected with TB. In 1938, among the 46 vaccinated animals already slaughtered, two, *i.e.* 4·3%, were TB.-infected. Of the 37 control animals slaughtered, 17 (54·9%) were infected.

Two other herds known to be infected with TB. were also investigated. In these herds calves received only subcutaneous BCG vaccinations before 1932, were fed on milk from the TB.-infected herd, and were kept in contact with this herd from birth. Of 88 animals slaughtered during the period 1932–38, 31 (35·2%) were found to be infected. After 1932, primary intravenous and subcutaneous vaccination was followed by annual subcutaneous vaccinations. The calves were separated for one month and fed on pasteurized milk. Of 96 slaughtered, six or 6·3% were TB.-infected. An accurate comparison is not possible as the double vaccination was in younger animals, but available evidence favours the latter method.—J. A. GRIFFITHS.

CANADA. (1939). **Report of the Veterinary Director General for the Year ended March 31, 1939.** [CAMERON, A. E.]—pp. 41. Ottawa: J. O. Pattenaude. [8vo].

There were no outbreaks of GLANDERS, DOURINE, SWINE FEVER, FOOT AND MOUTH DISEASE, RABIES or SHEEP SCAB during the year. There were only three outbreaks of ANTHRAX. An outbreak of suspected EQUINE ENCEPHALOMYELITIS with about 25 cases occurred in Ontario; chick vaccine is to be provided at cost price. Three outbreaks of MANGE in cattle were reported from Ontario and one from Alberta, 18 animals being found infected. 227 horses were quarantined as contacts or suspects in four outbreaks of mange, one outbreak occurring in Quebec and three in Ontario.

The freedom from other scheduled diseases has permitted the TUBERCULOSIS eradication campaign to be carried on unhampered. The tuberculin test has been applied on a large scale. Before herds are accepted under the Accredited Herd Plan they must include at least five pure-bred cattle of one breed, and before an accredited herd certificate is issued the herd must contain ten pure-bred registered cattle. Two clean tests with an interval of a year or, if infection is found, three clean tests with intervals of six months, are required for a herd to become accredited. Compensation is paid for reactors slaughtered. Herds which do not qualify as accredited may be tested under the Supervised Herd Plan. The same methods are followed but no compensation is paid for reactors, although they must be slaughtered. When a district is established as a restricted area, supervised herds are included in the area test. When two-thirds of the stock owners in an area petition the Minister of Agriculture for the area to be made restricted, the area is gazetted and the cattle are tested and compensation is paid. Cattle introduced afterwards into the area must be tuberculin tested. The highest percentages of reactions in initial tests during the year were 34·0 in one municipality and 32·0 in another, but these are exceptionally high, the majority of the herds tested during the year having less than 2·0% of reactors. Only nine more of the 98 counties or municipalities yielded figures above 2%. The 1,101,073 cattle tested had 10,784 (0·98%) reactors which were slaughtered at a compensation cost of $325,434.

The control of CONTAGIOUS ABORTION is carried out by means of blood tests of the cattle of all owners who wish to eliminate the disease. The infected animals are segregated or slaughtered as circumstances warrant. Owners must agree to re-test at short intervals and to employ a qualified veterinarian to take blood samples and to forward them to one of the departmental laboratories for testing. After a herd has remained free for a year a check test is made by a government veterinary inspector and the herd is then listed as a Bang's-free herd.

The feeding of swine with garbage, swill, meat scraps, offal, or vegetable refuse, either raw or cooked, obtained elsewhere than on the premises is prohibited except under licence, when the food must be thoroughly cooked and the premises kept in a sanitary condition.

All dairies and cattle supplying milk to the U.S.A. are inspected by veterinary officers of the Department of Agriculture. During the year, 18,100 cattle were exported to Great Britain. No cattle for breeding or milk production may be exported from Canada without passing the tuberculin test and a blood test for Bang's disease. Details are given of the operations under meat export inspection, including the export of cattle to Great Britain and the inspection of stock vans and yards.

Data are given in tables concerning the Supervised Herd Plan, Restricted Areas for the eradication of BOVINE TUBERCULOSIS, the Tuberculosis Accredited Herd Plan, Tuberculosis Area Testing, compensation paid, number of animals slaughtered on account of certain diseases in previous years, and import inspection.

The work of the Meat and Canned Foods section of the department is dealt with separately [see below].—J. A. GRIFFITHS.

CANADA. (1939). **[Report of] Meat and Canned Foods Section, 1938-39.** [MACONACHIE, C.]—*Rep. vet. Dir. gen. Dep. Agric. Can. 1938-39.* pp. 31–41.

There are 280 full-time employees in the Meat Inspection Section of the Health of Animals Division. There was a decrease in the numbers of cattle, sheep, and swine slaughtered in every province except New Brunswick and Nova Scotia, due probably to drought conditions in the western provinces. There was a great reduction in the numbers of animals found dead. The condemnation percentage has decreased in all classes. 1,025 carcasses were exported to Great Britain in 41 shipments on an experimental basis.

The report includes figures for slaughter and condemnations for the past 32 years during which meat inspection has been in force. The numbers of animals slaughtered during the year were 853,739 cattle, 676,395 calves, 780,287 sheep, 3,054,740 swine, 714,676 poultry, 2,026 bison, and 36 goats. The results of the inspection of carcasses were :– cattle, 841,909 carcasses passed and 11,830 (1·38%) condemned ; calves, 670,852 carcasses passed and 5,543 (0·82%) condemned ; sheep, 777,964 carcasses passed and 2,323 (0·29%) condemned; swine, 3,047,972 carcasses passed and 6,768 (0·22% condemned. Of the cattle carcasses condemned 65·22% were on account of emaciation, mucoid degeneration and TUBERCULOSIS. In calves the main cause of condemnation was immaturity. In swine TUBERCULOSIS was the cause of condemnation in 37·2% of the carcasses and in 72·91% of the portions rejected. Of the mature cattle slaughtered 4·75% were bulls, 32·49% steers, 36·24% cows, and 26·52% heifers. Details are given of meat imports and exports inspected.—J. A. G.

CANADA. (1939). **Summary Report of the Division of Animal Husbandry For the Period April 1, 1930 to December 31, 1936.** pp. 50. Ottawa : Minister of Agriculture. [8vo].

The Animal Husbandry Division is concerned with the livestock on the Central Experimental Farm and supervises work on branch farms in other parts of Canada. The main features in disease eradication on this farm are the elimination of BOVINE TUBERCULOSIS, CONTAGIOUS ABORTION, and MASTITIS. Annual tuberculin tests and blood tests for contagious abortion are carried out, and the whole herd has been almost entirely free from reactions. The elimination of these two diseases has not, however, solved the problem of herd wastage. The incidence of mastitis is unduly high, and has accounted for much of the wastage in the herd in recent years ; further study of the problem is necessary as the tests and procedure for detecting and eliminating bovine mastitis are less efficient than those for TB. and bovine contagious abortion. Cod liver oil fed in the concentrate mixture was found to be more palatable for dairy cows in the proportion of 1 : 4,000 than when used 1 : 2,000, but in neither concentration was there any taint in the milk.

Experiments were carried out on the value of certain types of window glass for transmission of the ultra-violet rays of the sun for the prevention of rickets in winter-fed pigs. No advantage over ordinary window glass was found in any of the special commercial glasses tested.—J. A. GRIFFITHS.

CANADA. (1938). **Progress Report of the Dominion Poultry Husbandman for the Years 1934 to 1936, inclusive.** [ELFORD, F. C.] pp. 44. Ottawa : Minister of Agriculture. [8vo].

In the section dealing with studies on FERTILITY only short statements on the various phases of the work are made, the publications which contain detailed information being referred to. In studies on the relation of production to mortality, no evidence was obtained to indicate that the strain of heavy production shortens the life of a pullet : the contrary appeared to be the case.

The toxic properties of some cod liver oils were investigated. The vitamin content is assayed biologically with chicks ; the chemical composition varies with the amount of the free fatty acids which are sometimes present from 0–80% or more. Results of other investigations have indicated that the presence in oils of certain free fatty acids is definitely toxic to chicks. An analysis of the oils indicated that a high free fatty acid content was usually associated with toxic products probably produced during decomposition of the liver during the manufacture of the oils. Feeding experiments on chicks confirmed this observation, and

removal of these toxic products from the oils resulted in increased growth, uniformity, and egg production; the detrimental effect of the oils containing the toxic products was particularly marked in cockerels. It is suggested that sun-rendered oils or oils produced from stale livers should not be used for poultry feeding.

The nature of CANNIBALISM was investigated. The records of all affected birds were examined over a period of years. There were 940 cases out of 3,664 autopsies or 12% of all deaths in the farm flock in nine years caused by cannibalism. There were no cases in the first year of life but thereafter there was a gradual increase up to 25% in the last (ninth) year. The egg production of the affected birds was only rather more than half that of the unaffected birds. The birds which were attacked were apparently the abnormal ones. Many had never laid an egg and practically all were out of production or laying at a much lower rate than their pen-mates. It is suggested that this is a process of natural elimination of the weaklings. It is therefore to be expected that where parasitism or other debilitating diseases are present in a flock, cannibalism will be high. A healthy vigorous flock is the best safeguard against cannibalism.—J. A. GRIFFITHS.

CANADA. (1938). **Report of the Poultry Pathology Laboratory of the Health of Animals Branch for the Years 1934, 1935 and 1936.** [WEAVER, C. H.]—*Progr. Rep. Dom. Poult. Husbandman, Dep. Agric., Can., 1934–36.* pp. 36–44. [See also *V. B.* 8. 57].

During the three years the number of pathological specimens examined was 4,576. Of these, 18·9% were due to uncomplicated intestinal PARASITISM. Diseases caused by filtrable viruses were next in importance (13·78%). PULLORUM DISEASE was still very important, although many flocks have been freed from infection and control is in sight; control measures taken included testing of 50,651 blood samples. Tremendous losses occur from conditions classified as SPORADIC DISEASES, *i.e.* pericarditis, peritonitis, reproductive diseases, avitaminosis, digestive and liver troubles; these make up 24·69%. CANNIBALISM and feather pulling also occur. A systematic examination of the blood of fowls was undertaken as a basic study of the causes of the increasing incidence of sporadic diseases, particularly the two forms of LEUCOSIS, one seemingly benign and the other infectious, but both dependent diagnostically on leucocytic and differential blood counts.

Cross-infection experiments with pure cultures of organisms obtained from two outbreaks of PASTEURELLA INFECTION, one in wild ducks reared on an experimental farm and the other in a poultry flock, showed that there was almost complete reciprocal relationship in regard to pathogenicity in these two strains of *Past. aviseptica*. It is suggested that this may explain the sporadic occurrence of the infection in different varieties of waterfowl, as chickens are known to act as carriers of *Past. aviseptica*.

Much time has been devoted to finding a practical method of immunizing birds against COCCIDIOSIS. The influence of various chemicals in sporulation of oocysts and their subsequent behaviour in the tissues has been studied.

Attempts were made to measure the immunity induced by intra-abdominal injection of embryonated eggs of *Ascaridia galli*; cross-immunity tests were made with embryonated eggs and protein derivatives of different species of nematodes which infest fowls. In attempts to hatch eggs of capillarids from the intestine of the fowl, using tap-water and potassium bichromate as media, it was found that they developed normally to the coiled embryo stage. Attempts to infect parasite-free chicks have been repeatedly unsuccessful. Although capillarid worms are less prevalent than ascarids or heterakids, they are seriously pathogenic.

—J. A. GRIFFITHS.

CANADA. (1939). **Progress Report of the Dominion Agricultural Bacteriologist for the year 1937.** [LOCKHEAD, A. G.] pp. 25. Ottawa: Minister of Agriculture. [8vo].

This report deals with cases in which MASTITIS is diagnosed as the result of the findings of indirect biochemical tests even though the affected quarters are free from streptococci. Fluctuations occur in the results of cell counts and of such tests (catalase, chlorides, pH). These fluctuations were frequently of a rhythmic nature, high values for chlorides, catalase, and pH following high bacterial counts at the preceding milking. In general, counts were highest in the morning milking and biochemical values in the afternoon milking.

The values in normal milk are put at 0·13% for chlorides and at 40% for catalase, with a pH value of 6·8. The catalase test (by the Hastings tube method) is thought to be of most value in detecting secretion disturbances in quarters free from streptococcal infection and also superior to the chloride and pH tests in the early detection of *Str. agalactiae* infection. The possibility is suggested that a biological agent other than bacteria may be responsible for the abnormalities in the composition of the milk. In such cases there is no evidence of inflammation of the udder and there appears to be little justification for the exclusion of such milk from the fluid milk market.—J. A. G.

CANADA. (1937). **Ontario. [Report of work on] Pathology and Bacteriology [Ontario Research Foundation, 1936].** [HADWEN].—*Rep. Ont. Res. Fdn, 1936.* pp. 17–18.

Systematic studies of milk samples from herds in the neighbourhood of Toronto were made to obtain a combined bacteriological and pathological picture of bovine MASTITIS; this was supported by a clinical examination of the cows' udders. A limited amount of histological study of the normal udder and of udders carrying various types of infection was made. The results indicate that there is very little chance of reaching or destroying organisms high up in the walls of ducts by therapeutic udder infusion. Methods for obtaining an accurate diagnosis were studied. When microscopic examination of a centrifuged sample was taken as a standard, other tests showed that (a) cultural methods failed to detect infection in 8%, (b) bromthymol blue and rennet coagulation failed in 28·7%, and (c) clinical examination failed in 19·2% of infected cows. Examinations were made of 461 cows, and of these 41·2% showed evidence of mastitis while 9·7% were doubtful. Of the 232 cases of mastitis, 65·5% were due to streptococcal infection and 22·8% to staphylococcal infection. First lactation animals showed 12·6% infection as compared with 49 4% in the older cows.

Under PARASITOLOGY mention is made of the failure of male fern and carbon tetrachloride in the treatment of lambs infested with the fringed tapeworm (*Thysanosoma actinioides*), but a 1% solution of copper sulphate with "black-leaf 40" is said to be useful. There were only 4% of failures among lambs treated. —J. A. GRIFFITHS.

CANADA. (1940). **[Report of Work on] Pathology and Bacteriology [by Ontario Research Foundation], 1939.** [HADWEN].—*Rep. Ont. Res. Fdn, 1939.* pp. 10–11.

The department published a report on BOVINE MASTITIS which details the microscopic method of diagnosis, and this has been used successfully in the field. Examination of samples from range cattle indicates that these animals are generally free from mastitis. Five samples of reindeer milk proved free from infection.

HADWEN submitted a report on a tour which he made through the west and to the Arctic to study the conditions of wild life in two of the National parks and the conditions of the reindeer herd at Aklavik.

The department continued the investigation into the life-history of *Oestrus ovis*; the rate of growth of the parasite is independent of atmospheric temperature and the reason why the larvae grow more rapidly in the summer than in winter is still unknown. TRICHINOSIS of pigs is being studied to determine whether trichinae can pass undeveloped through the alimentary tract of rats, and whether such larvae in rat faeces are infective to pigs.—J. A. G.

CANADA. (1939). **Report of the Ontario Veterinary College, 1938.** [MCGILVRAY, C. D.] pp. 58. Toronto: T. E. Bowman. [8vo].

A total of 261 students was enrolled; this number is greatly in excess of that for which accommodation is available. There are special courses for fur farmers and practising veterinarians.

An extension service furnishes specialized assistance in diagnosis, and preventive and operative treatment for all animals. In the animal clinics 225 horses, 150 cattle, 100 swine, 100 sheep, and 150 dogs and cats were treated. Radiodiagnostic examinations have been made much use of in the diagnosis of abnormalities which could not be recognized by other means. The biological laboratory service supplied 82,900 doses of *Salmonella pullorum* antigen and sera for the pullorum agglutination test, 11,610 test doses of *Brucella abortus* antigen, and 850 doses of a polyvalent vaccine for pregnant mares to prevent JOINT-ILL in the foals; CONTAGIOUS ABORTION work included 26,487 serological tests of which 3,925 (14·8%) were positive. The poultry laboratory service carried out routine examination of 2,131 birds

sent for diagnosis. The general laboratory service examined 1,112 specimens. It is suggested that the increase in the demand for veterinary services, including research and extension services, justifies a special animal diseases investigation branch. Reports on special investigations published in the report have been abstracted elsewhere in the *Vet. Bull.* —J. A. GRIFFITHS.

CANADA. (1939). **Report of the Clinical Department, Ontario Veterinary College.** [MCINTOSH, R. A.]—*Rep. Ont. vet. Coll. 1938.* pp. 50–55.

The department is concerned with the practical application of veterinary medicine and surgery for the purpose of instructing students. A form of extension service provides treatment for cases which practitioners may find inconvenient to handle. All species of animals are treated and the nature of the cases is varied. The 225 horses submitted were mainly surgical cases. The 150 cattle treated included cases of STERILITY and abnormal breeding, ABORTION, MASTITIS, TUBERCULOSIS, HAEMORRHAGIC SEPTICAEMIA, ACTINOMYCOSIS, and calf diseases. Upwards of 100 swine submitted included cases of HERNIA, CRYPTORCHIDISM and other congenital aberrations as well as conditions affecting litters and herds. These included piglet ANAEMIA, GASTRO-ENTERITIS, PNEUMONIC INFECTIONS, PARASITISM and NUTRITIONAL DISTURBANCES. The infectious diseases included HAEMORRHAGIC SEPTICAEMIA, SWINE ERYSIPELAS, NECROTIC ENTERITIS, and general SEPSIS. The sheep treated were not as numerous as the swine. The cases included HAEMORRHAGIC SEPTICAEMIA, PARASITISM, PREGNANCY DISORDERS, and NUTRITIONAL DISEASES. The small animal clinic treated 150 dogs, cats, and other pets. The most common conditions were MANGE, ECZEMA, CHOREA, GASTRITIS, DISTEMPER, FRACTURES, and DIETARY DISORDERS.

A number of cases are described in detail, *viz*, TUBERCULOSIS in a horse due to the bovine strain, clinical TUBERCULOSIS in a cow, STERILITY in cows due to non-infectious conditions, artificial ABORTION in an immature heifer, and STIFF LAMB DISEASE.—J. A. G.

I. CANADA, PROVINCE OF NEW BRUNSWICK. (1939). **Report of Provincial Veterinarian, 1938-1939.** [AKINS, J. T.]—*Rep. Dep. Agric. New Brunswick, 1938–1939.* pp. 29–33.

II. CANADA, PROVINCE OF NEW BRUNSWICK. (1939). **[Report on] Pullorum Disease Control, 1938-1939.** [WOOD, F. L.]—*Ibid.* pp. 38–42.

I. Animal health in the Province showed some improvement in many respects. There was no reported outbreak of HAEMORRHAGIC SEPTICAEMIA of cattle. BOVINE CONTAGIOUS ABORTION was actively combated. Inoculation of calves with live vaccine was done with caution in herds in which the majority of animals were infected. Of 3,602 cattle tested, 4·66% reacted. Preventive inoculations with vaccine were used in the control of an outbreak of BLACKLEG in cattle in the Shemogue district. Isolated outbreaks of COCCIDIOSIS in cattle were also diagnosed. There were extensive outbreaks of EQUINE INFLUENZA. In the control of INTERNAL PARASITES of horses collective treatment for bots and round worms was carried out in various districts, the animals being brought to a common centre. A case is mentioned of a cryptorchid boar siring many litters containing five and six cryptorchids.

There were 0·5% reactors in 44,673 birds tested for *Salmonella pullorum* infection. AVIAN LEUCOSIS was becoming widespread. COCCIDIOSIS and caecal worms were found in many birds examined at the laboratory.

There were no outbreaks of infectious diseases among foxes and minks, but numbers of cases of food poisoning, deficiency diseases, and parasitic infestations occurred on many ranches. A condition in which paralysis and convulsions occurred in fox pups on one ranch was successfully treated by intramuscular inoculations of vitamin B_1.

II. During the past 12 years PULLORUM DISEASE control has been carried out with the willing co-operation of farmers. The improvement effected has resulted in practically the whole egg supply of the hatcheries being drawn from flocks free from reactors. "The almost entire absence of reactors among flocks tested in 1938 speaks well for the work of the veterinary laboratory." 85% of the flocks were entirely free from the disease and nearly half of those showing reactors had only a single infected bird.—J. A. GRIFFITHS.

SOUTHERN RHODESIA. (1941). **Report of the Chief Veterinary Surgeon for the year 1940.** [MYHILL, B. A.] pp. 11. Salisbury: Rhodesia Printing & Publishing Co., Ltd. [fcp].

The staff includes 12 veterinary officers and 46 European cattle inspectors. The year was a satisfactory one for livestock. Grazing and water were plentiful and poverty losses small. On the whole the year was also satisfactory from the veterinary aspect. ANTHRAX was controlled by the use of spore vaccine, 63,980 doses being issued. BLACKLEG mortality was considerable especially in the Gwelo district. The tuberculin test applied to 921 cattle imported showed 14 reactors. 188 cattle tested prior to export were all negative. Of 49,047 cattle slaughtered at Bulawayo only three were infected with TUBERCULOSIS and only 18 were infected among the 12,947 cattle slaughtered at West Nicholson. There were no cases of GLANDERS; 57 imported equines were negative to the mallein test. PIROPLASMOSIS and ANAPLASMOSIS caused mortality in all districts.

The total mortality from EAST COAST FEVER was 728, but the disease was confined to a small localized area. The situation regarding TRYPANOSOMIASIS in the Chipinga district was much better, only 20 cases occurring as compared with 311 in 1939. A few cases were also found on the Umtali commonage and adjoining farms as well as on farms near the Portuguese East Africa border, south of Umtali. No tsetse flies have been recorded in these areas. Ticks were active in all districts, especially during June-October when dipping is not enforced. During the rest of the year cattle dipping is compulsory; this cleans the cattle but does not free the farms of ticks. When cattle are in their poorest condition, during September and October, they cannot stand up to the travelling at short intervals for dipping at the nearest dipping tank. The bont-tick (*Amblyomma hebraeum*) has spread considerably in recent years and, in consequence, HEARTWATER continues to be a cause of mortality. SHEEP SCAB occurred in a few sheep in the Gwelo district. SCABIES in pigs was widespread in the Bulawayo district where treatment was effective if the housing conditions were good. FOOT AND MOUTH DISEASE again broke out and was thought to be spread by wild game; two Kudu shot had lesions of the disease.

49,047 cattle were slaughtered at the Cold Storage Commission's abattoirs at Bulawayo and 12,947 at Messrs. Liebig's (Rhodesia) factory at West Nicholson, a total increase of over 14,000 head on the previous year. Most of this meat was exported to the United Kingdom.—J. A. GRIFFITHS.

SOUTHERN RHODESIA. (1941). **Report of the Director of Veterinary Research for the Year 1940.** [LAWRENCE, D. A.] pp. 9. Salisbury: Rhodesian Printing & Publishing Co., Ltd. [fcp].

The staff consists of the director, veterinary research officer and four European assistants. The main work consists of diagnosis, production and distribution of vaccines, and premunization of imported cattle against ANAPLASMOSIS and PIROPLASMOSIS. Research was confined to improving the technique of diagnostic methods. The number of blood smears examined for stock owners or members of the department was 2,242. Five were positive for ANTHRAX, 25 for BLACKLEG, 237 for ANAPLASMOSIS, 86 for PIROPLASMOSIS, 320 for EAST COAST FEVER, 6 for *Theileria mutans*, 23 for Koch's bodies and small piroplasms (not considered to be *T. parva*), 2 for *Babesia canis*, 2 for *B. equi*, and 14 for *Trypanosoma congolense*. 1,721 samples of serum of which 242 were positive were examined for BRUCELLOSIS. 2,112 samples of poultry sera were all negative for PULLORUM DISEASE. A few *Salmonella gallinarum* reactors were detected and the diagnosis confirmed by cultural methods.

Vaccines issued were: BLACKLEG 123,330 doses, HORSE SICKNESS 2,029, FOWL POX 35,000, and BLUETONGUE 3,796 doses. Various other vaccines, NODULAR WORM remedy, trypanblue, tartar emetic, and antimosan were also issued. A severe case of HORSE SICKNESS treated with uleron recovered.

Southern Rhodesia is said to be singularly free from serious pig diseases; *Ascaris* infestation is the most serious cause of losses. "SWEATING SICKNESS" of calves is said to be cured by giving ¼ lb. liver meal in ½ pint of water once or twice at intervals of 24 hours, as soon as the first symptoms appear. An outbreak of a THEILERIASIS occurred during the year on a farm near Salisbury. The parasite differed greatly from the four known species of *Theileria*. Blood inoculation failed to transmit the disease and passage through ticks was unfortunately not possible. The disease was cured in several definite cases by the use of uleron given in solution intravenously. An eland when tested proved resistant to inoculation by nymphal ticks with EAST COAST FEVER parasites; the adults from the nymphs used proved non-infective when fed on a calf susceptible to E.C.F.—J. A. GRIFFITHS.

CEYLON. (1941). **Report of the Government Veterinary Surgeon for 1939.** [CRAWFORD, M.] pp. 4. Colombo: Govt. Press. [8vo].

There was a small increase in the combined numbers of cattle and buffaloes and also of goats, but a small decrease in the number of sheep. There was also an increase in the number of cattle sold for slaughter. Contagious disease outbreaks apparently accounted for the loss of only 888 animals; these figures of cases actually reported, however, are usually much below the actual losses. HAEMORRHAGIC SEPTICAEMIA occurred in four provinces with 35 deaths. ANTHRAX was more widespread with 109 deaths; imported, unsterilized bone meal is thought to have been the source of infection. Only one case of BOVINE TUBERCULOSIS was diagnosed; there were no cases among the 41,261 cattle slaughtered at Colombo and Kandy abattoirs. BLACKLEG caused 146 deaths. The only outbreak of RINDERPEST was in the quarantine station among buffaloes imported from India. 191 of the dog brains examined at the Pasteur Institute were positive for RABIES. No outbreak of INFECTIOUS PLEURO-PNEUMONIA of goats was reported, but GOAT POX occurred in the North Western Province. NEWCASTLE DISEASE continued to cause losses.

At the veterinary laboratory trials of artificial insemination of cattle were made; 50% were successful. 518 routine specimens were examined. A small amount of FOWL POX vaccine was produced. An outbreak of LEPTOSPIROSIS in dogs was investigated. Two types were differentiated clinically:– (1) haemorrhagic enteritis without jaundice, and (2) a form with jaundice, petechiae, and haemorrhages of serous membranes. Cases of posterior paresis and paralysis in male stud goats occurred at a number of places; the cause is suspected to be LATHYRISM.

Only one veterinary dispensary was in operation.—J. A. GRIFFITHS.

FIJI. (1941). **Summary of Annual Report, Veterinary Division, Department of Agriculture, 1940.** [TURBET, C. R.] pp. 4. Suva: Govt. Printer. [8vo].

The veterinary clinic and hospital at Suva treated 656 animals, 156 in the hospital; at Nadi 105 animals were treated. The Stock Improvement Ordinance allows of compulsory castration of unsuitable stallions and bulls. All imported animals are dealt with under the animals importation and port quarantine regulations; the only disease detected was PULLORUM DISEASE in poultry. Animal husbandry forms a large part of the work of the department, particularly measures for increasing milk, pig, and poultry production.

During the year, 1,918 tuberculin tests were carried out and 130 (6·8%) were positive. BOVINE CONTAGIOUS ABORTION is enzootic in a few areas; by a combined system of testing and slaughter in some cases the prospects of elimination of the disease are considered good; 482 samples of blood tested showed 15·1% reactions. Diseased animals destroyed included 6 with ACTINOMYCOSIS, 150 with TUBERCULOSIS, 4 with CONTAGIOUS ABORTION, and 35 with CANCER. BACILLARY WHITE DIARRHOEA occurred for the first time; 37·7% of 142 blood samples were infected. Other conditions included:– a few cases of MASTITIS in cows; one case of MALIGNANT OEDEMA in a horse; HELMINTH INFESTATIONS in all species of livestock; COCCIDIOSIS and STEPHANURIASIS of pigs; FILARIASIS of dogs; INFECTIOUS KERATITIS of cattle, horses and sheep; FOWL POX and INFECTIOUS CORYZA of fowls; DISTEMPER in only a few dogs; much debility due to malnutrition, particularly in the dry zone.

In the laboratories 858 specimens were examined. The livestock census showed 14,000 horses, 75,000 cattle, 480 sheep, 26,000 goats, and 4,500 pigs. The numbers of animals slaughtered for food were 6,500 cattle, 400 sheep, 4,000 goats, and 2,000 pigs.—J. A. G.

BRITISH GUIANA. (1941). **Administration Report of the Director of Agriculture for the Year 1939.** Items of veterinary interest pp. 3–4.

H. A. FRASER was appointed veterinary surgeon at the beginning of the year. A condensed version only of his report is published. Few diseases were reported during the year among animals. Three deaths from ANTHRAX occurred. There were three cases of ANAPLASMOSIS among three-quarter-bred Holstein heifers; these recovered after sodium cacodylate had been given. The rise in prices of livestock has improved the general outlook for livestock owners. The livestock returns show that there are 133,351 cattle, 16 buffaloes, 11,346 goats, 2,808 horses, 1,537 mules, 7,628 donkeys, 31,895 sheep, and 27,248 swine in the territory. The grading up of small dairy farmers' cattle

with pure-bred Holstein and Guernsey bulls is now being extended to the country districts. The condition of the creole slaughter cattle is said to be worsening progressively, with the exception of the ranches, which are doing some good work with Hereford breeding. Improvement is very necessary before the colony can take advantage of the West Indian market for slaughter cattle.—J. A. GRIFFITHS.

RUMANIA. (1938). Raport asupra serviciului sanitar veterinar pe anni 1932–1935. **[Report of the Civil Veterinary Service for 1932-35].** pp. 195. Bucarest: Imprimeria Centrală. [4to].

There were 531 veterinary officers in the Rumanian civil veterinary service in 1932. The number rose to 547 in 1935. These officers were distributed over 71 districts.

During the period under review the following diseases were made notifiable or modifications made in the schedule:– TUBERCULOSIS of milch cows; BOVINE CONTAGIOUS ABORTION; GLANDERS; FOWL TYPHOID; PULLORUM DISEASE; SWINE ERYSIPELAS; SWINE FEVER; FOOT AND MOUTH DISEASE; SHEEP POX, and RABIES.

During 1932, 1,781 laboratory diagnoses were made, the number rising to 4,981 in 1934 and falling a little in 1935. The diseases diagnosed included ANTHRAX, BOVINE TUBERCULOSIS, GLANDERS, BRUCELLOSIS, BLACKLEG, BOTRIOMYCOSIS, PIROPLASMOSIS in horses, cattle, and sheep, INFECTIOUS POLYNEURITIS, and various diseases of sheep, swine, and fowls.

Animals affected by epizootics during the year 1932 are tabulated. ANTHRAX affected 353 horses, 2,947 cattle, 1,061 sheep, and 11 swine. There were 1,101 cases of GLANDERS. FOOT AND MOUTH DISEASE affected 430,769 cattle, 57,821 swine, and 322,421 sheep. There were 95,486 cases of SHEEP POX.

In 1933, 341 horses, 2,733 cattle, 1,390 sheep, and 40 swine were affected by ANTHRAX. There were 1,268 cases of GLANDERS. FOOT AND MOUTH DISEASE affected 28,275 bovines. SHEEP POX affected 68,602 sheep.

In 1934, there were 282 cases of ANTHRAX in horses, 2,824 in cattle, 76 in swine, and 1,852 in sheep. There were 1,493 cases of GLANDERS. FOOT AND MOUTH DISEASE affected 778 bovines. There were 124,352 cases of SHEEP POX.

In 1935, ANTHRAX affected 523 horses, 3,383 cattle, 71 swine, and 3,963 sheep. There were also 127,914 cases of SHEEP POX. Figures for FOOT AND MOUTH DISEASE are not given for 1935.

The report includes a series of maps showing the district incidence of epizootics.

During the period 1932–1935 compensation paid for animals destroyed amounted to 21,050 lei.

There are a number of tables of the various animal species slaughtered in abattoirs during the period under review. The number of cattle slaughtered annually rose during the period from 780,000 to 1,134,000, that of buffaloes remained fairly constant between 26,000 and 30,000, and about 1½ million sheep, 33,000 goats, 700,000–800,000 pigs, and a few hundred horses were slaughtered annually. Statistics are given of the diseases and conditions found in the abattoirs.—M. WATSON.

BOOK REVIEW

ROLLESTON, H. [Bt., M.D., D.Sc., F.R.C.P.], & MONCRIEFF, A. [M.D., F.R.C.P.]. (1941). **Essentials of Modern Chemotherapy.** pp. vii+104. 3 figs. 1 appendix. London: Eyre & Spottiswoode. [8vo] [6s.]

This small book is based on a series of articles which appeared in *The Practitioner* in January 1940; they have, however, been revised in the light of more recent developments. In a short clear chapter, which might well have come first, the nomenclature and chief properties of the sulphonamides are described. Special chapters deal with the uses and abuses of these drugs both in general and in the treatment of streptococcal infections. The modern chemotherapy of meningococcal, pneumococcal, and gonococcal infections is then dealt with, and there is also a chapter on the use of sulphonamides in acute specific fever. In addition a section has been added on the use of sulphathiazole in staphylococcal infections, and there is an appendix on the use of sulphonamides in war time.

The book is up-to-date and well indexed. Surprisingly, however, there is no mention of sulphadiazene, although sulphanilylguanidine in intestinal infections is referred to. Some of the chapters give few or no references to the literature.—J. M. ROBSON.

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ERRATA.

Vol. **9.** p. 797. KRUPSKI, A. E., HUNGERBUHLER, F., & ALMASY, F (1937). for "After six days' vitamin treatment a retention of 62 g. of Ca and 54 g. of P was observed.", read "After a six days' balance experiment a retention of 62 g. of Ca and 58 g. of P was observed."

Vol. **10.** p. 637. AUSTRALIA, NEW SOUTH WALES. (1939). for "ANTHRAX.—It was found . . . the area.", read "ANTHRAX.—In work done to ascertain whether anthrax bacilli multiply in the soil, it was found possible to cultivate the bacilli in a mixture of sheep faeces and soil: an attempt is being made to cultivate the organisms in soil from anthrax areas."

Vol. **11.** p. 57. HERRELL, W. E., & BROWN, A. E. (1939). for 752-758, read 753-758.

p. 83. for ANON. (1940)., read MILLS, A. M. (1940).

p. 177. POPE, C. G. (1939). for **"The Action of Proteolytic Enzymes of the Antitoxins"**, read **"The Action of Proteolytic Enzymes on the Antitoxins".**

p. 245. BLUNN, C. T., & HUGHES, E. H. (1938). for *J. Hered.* **30.**, read *J. Hered.* **29.**

p. 325. ERHARDT, A. (1938). for "Filimaronöl", read "filmarone oil".

p. 879. SCHAAF, J. (1940). for "the German-occupied area of Poland." read "the former republic of Poland."